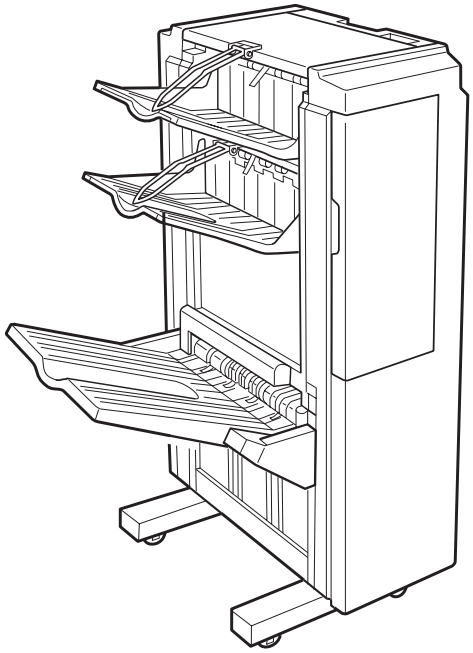
SHARP SERVICE MANUAL

CODE: 00ZARFN3//A1E



3-TRAY FINISHER

MODEL AR-FN3

CONTENTS

[1] BASIC SPECIFICATIONS 1-1

[2] UNPACKING AND INSTALLATION 2-1

[3] EXTERNAL VIEW AND INTERNAL STRUCTURE 3-1

[4] OPERATIONAL DESCRIPTIONS 4-1

[5] DISASSEMBLY AND ASSEMBLY 5-1

[6] ADJUSTMENTS 6-1

[7] MAINTENANCE 7-1

[8] TROUBLESHOOTING 8-1

[9] CIRCUIT DESCRIPTIONS 9-1

[10] ELECTRICAL SECTION 10-1

PARTS GUIDE

Parts marked with "⚠" is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

[1] BASIC SPECIFICATIONS

1. Type

Copier-fitted type (detachable)

2. Tray

1) Number of trays	3	
2) Type	Top (tray 1)	Normal tray
	Middle (tray 2)	Normal tray
	Bottom (tray 3)	Lift tray
3) Number of sheets loadable	Normal tray	500 (80 g/m^2)
	Lift tray	1500 (A4/11" × 8.5") 750 (A3/11" × 17") (80 g/m^2)

3. Paper transport

Center reference

4. Storage

Face-down

5. Discharge size

Face-down	Top	A3 ~ A6R/11 × 17 ~ 8.5 × 5.5, special paper
	Middle	A3 ~ A5/11 × 17 ~ 8.5 × 5.5
	Bottom	A3 ~ B5/ 11 × 17 ~ 8.5 × 11

6. Paper weight

Face-down	Top	50 ~ 128 g/m^2, 176g/m^2, 200m^2
	Middle	64 ~ 128 g/m^2
	Bottom	64 ~ 128 g/m^2

7. Paper full detection

Top	Provided
Middle	Provided
Bottom	Provided

8. Lift tray

Off-set	30 mm

9. Staple unit

Paper discharge tray	Lift tray	
Storage	Face-down	
Number of sheets that can be stapled	50 sheets (80 g/m^2) 25 sheets when the size is over A4/LT.	
Paper size	AB series	A3, B4, A4, A4R, B5
	Inch series	11" × 17"/8.5" × 14"/ 8.5" × 13"/8.5" × 11"/ 8.5" × 11"R
Stapling reference	1 point (front)/ 1 point (far end)/ 2 points	
Needle feed system	Cartridge (5000 needles)	
Detection	No needle/no cartridge/stapler rotation	
Service life	more than 100 K	
Manual mode	None	

10. Power supply

Supplied from copier (DC 24V, DC 5V)

11. Power consumption

MAX 72W

12. Dimensions

590 (W) × 560 (D) × 998 (H)

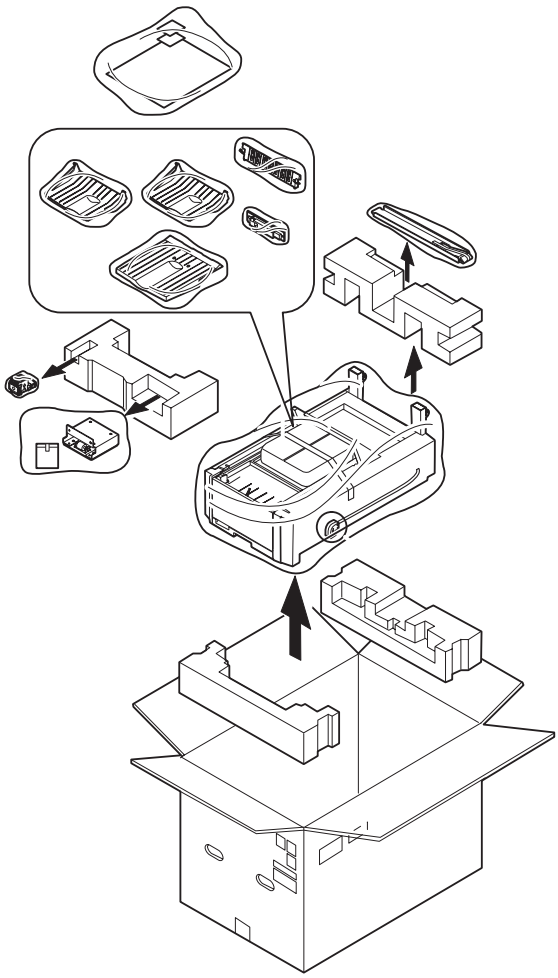
13. Weight

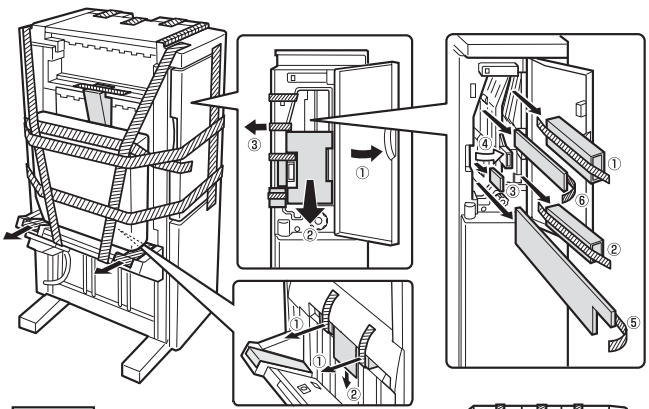
About 50 kg

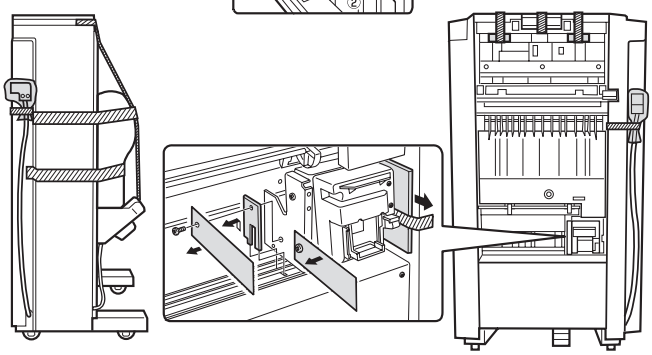
[2] UNPACKING AND INSTALLATION

1. Unpacking

Refer to the sketch below for unpacking.





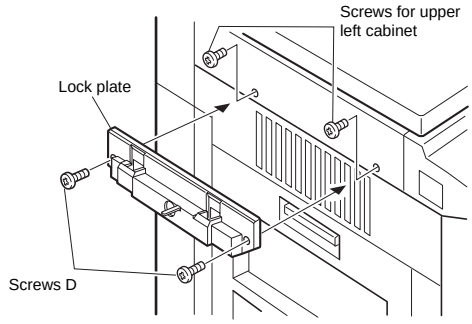


2. Installation

Unplug the copier's power cord before carrying out the following procedure.

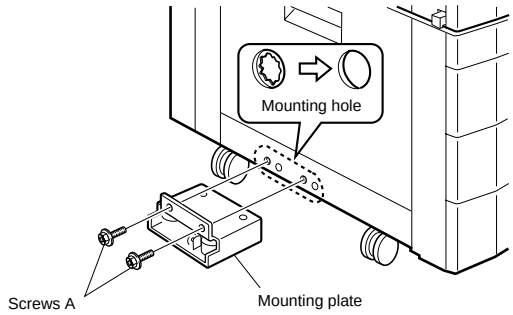
1. Attach the lock plate and mounting plate.

Remove the two screws from the upper left cabinet of the copiery and attach the lock plate to the upper left cabinet using two screws D.



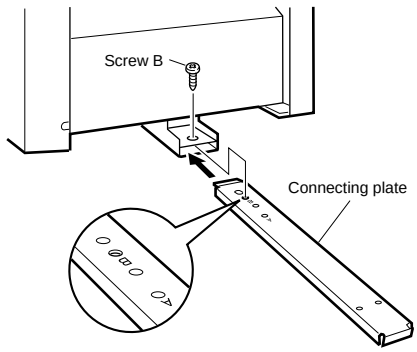
2. Attach the mounting plate.

Cut out the two mounting holes (the leftmost hole and the third hole from the left) at the lower part of the desk using a Phillips screwdriver, etc., and remove the burrs using a flat-blade screwdriver, etc.
Then, attach the mounting plate to the lower part of the desk using two screws A.



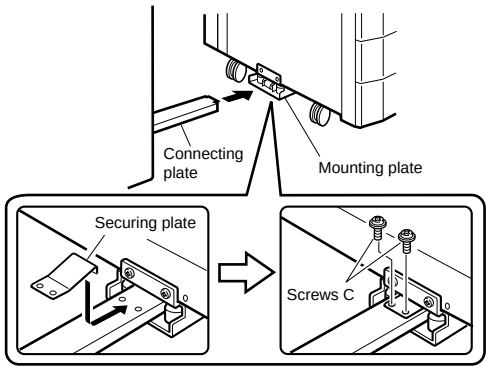
3. Attach the connecting plate to the finisher.

Insert the connecting plate into the lower part of the finisher and attach the plate at the position with mark B using screw B.



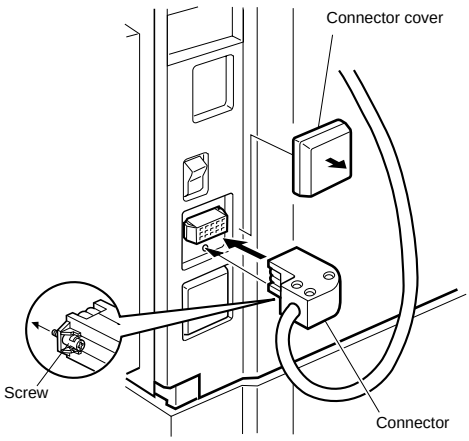
4. Insert the connecting plate of the finisher into the mounting plate of the desk.

Insert the connecting plate which has been attached to the finisher into the mounting plate of the desk.
Move the finisher away from the copier after insertion to check that the connecting plate is locked.
While the plate is locked, attach the securing plate using two black screws C.



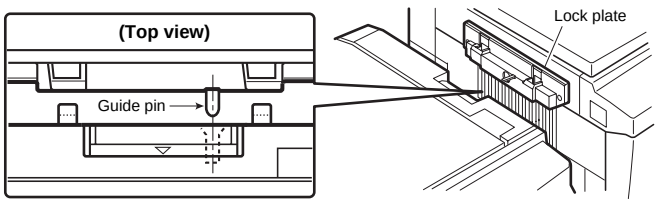
5. Connect the finisher connector.

Cut the connector cover on the copier with nippers. Fit the finisher relay harness to the copier and secure the connector by tightening the connector screw.



6. Check and adjust the height of the finisher.

- Put the finisher close to the copier and adjust and check so that the guide pin of the lock plate enters smoothly the connecting hole of the finisher.

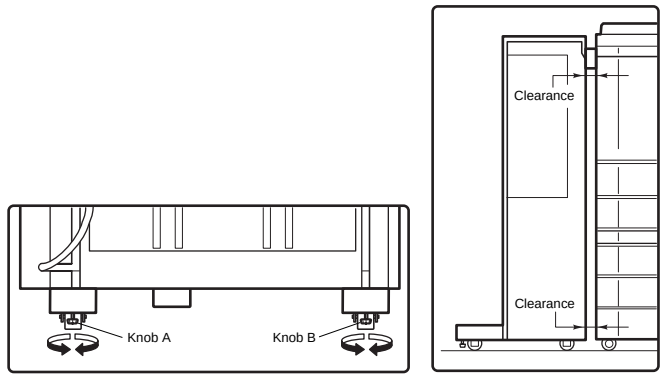


- Since adjustment has been made at shipping, this adjustment is basically not needed.

  If the guide pin should not be inserted smoothly, adjust the height using the following procedure.

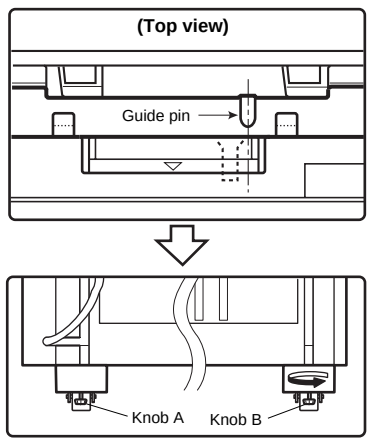
<1> If the guide pin of the lock plate matches the connecting hole of the finisher:

- If the clearance is narrow at the upper part:
  Turn knob A and knob B clockwise so that the clearances at the upper part and lower part are uniform.
- If the clearance is wide at the upper part:
  Turn knob A and knob B counterclockwise so that the clearances at the upper part and lower part are uniform.

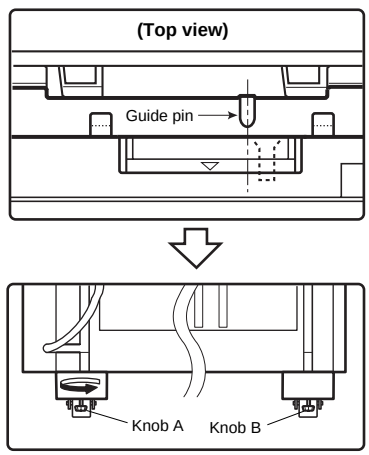


<2> If the guide pin of the lock plate does not match the connecting hole of the finisher:
Turn the knobs at the lower part of the finisher to adjust the height.

- If the connecting hole is offset toward the rear side:
  Turn knob B counterclockwise so that the connecting hole matches the guide pin.
  Then, push the finisher into the copier.
  If the clearance between the finisher and copier is not proper, adjust the clearances at the upper part and lower part using procedure <1>.

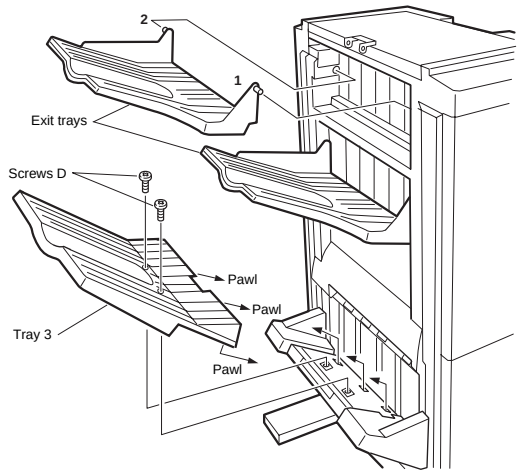


- If the connecting hole is offset toward the front side:
  Turn knob A counterclockwise so that the connecting hole matches the guide pin.
  Then, push the finisher into the copier.
  If the clearance between the finisher and copier is not proper, adjust the clearances at the upper part and lower part using procedure <1>.



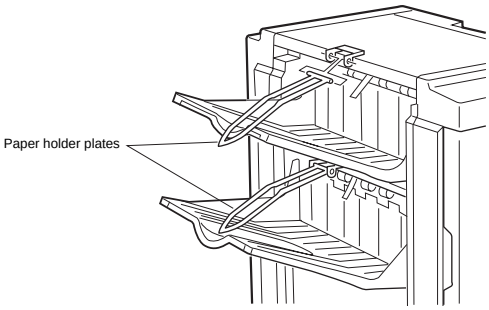
7. Attach the exit tray and tray 3.

Insert the three pawls at the rear side of tray 3 into the holes of the tray mounting platform and secure the tray using two screws.
Attach the two exit trays to the finisher from the boss at <1>.



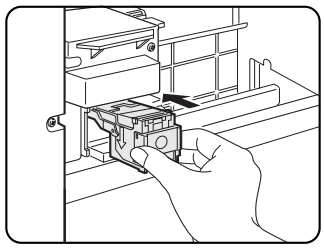
8. Attach the paper holder plates.

Attach the 2 paper holder plates to the attaching portion of the finisher by fitting them as shown in the illustration.

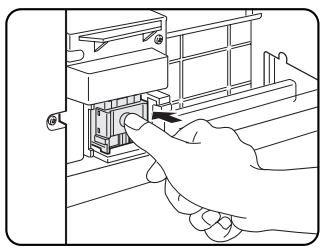


9. Attach the staple cartridge to the staple unit.

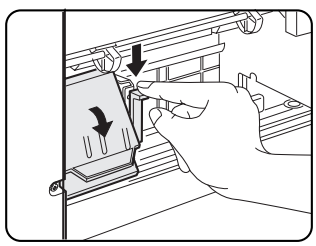
1) Insert the staple cartridge into the staple unit in the direction shown in the illustration.



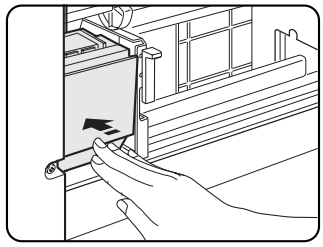
2) Push the staple cartridge in until it clicks in place.



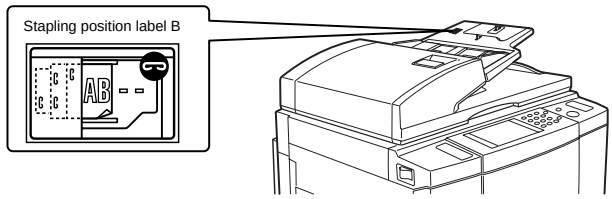
3) Push down the lock release lever to unlock the staple unit.



4) Push the staple unit until it locks.

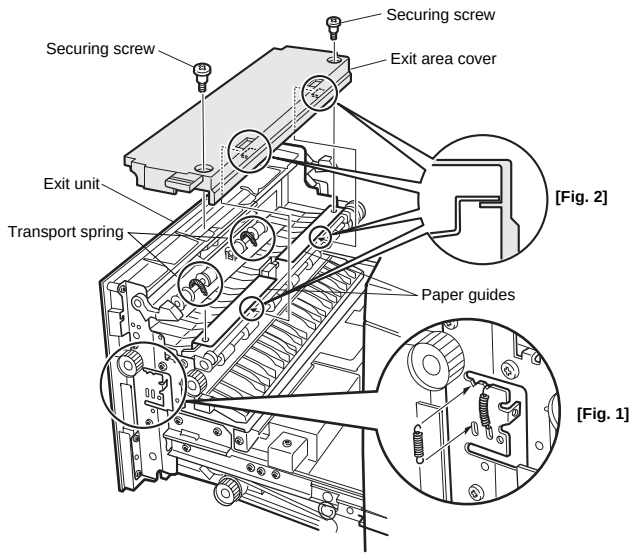


10. Paste the stapling position labels.



11. Remove the transport springs.

1. Pull out the exit unit of the copier until it stops.
2. Remove the 2 exit area cover securing screws and remove the exit area cover.
3. Remove the 2 transport springs which are attached to the exit area paper guide.
4. Store the 2 removed transport springs by hanging them on the exit unit front frame (shown in Fig. 1).
5. Attach the exit area cover to its original position and secure it using the 2 securing screws.
   At this time, ensure that the pawls of the exit area cover are under the paper guides. (See Fig. 2.)



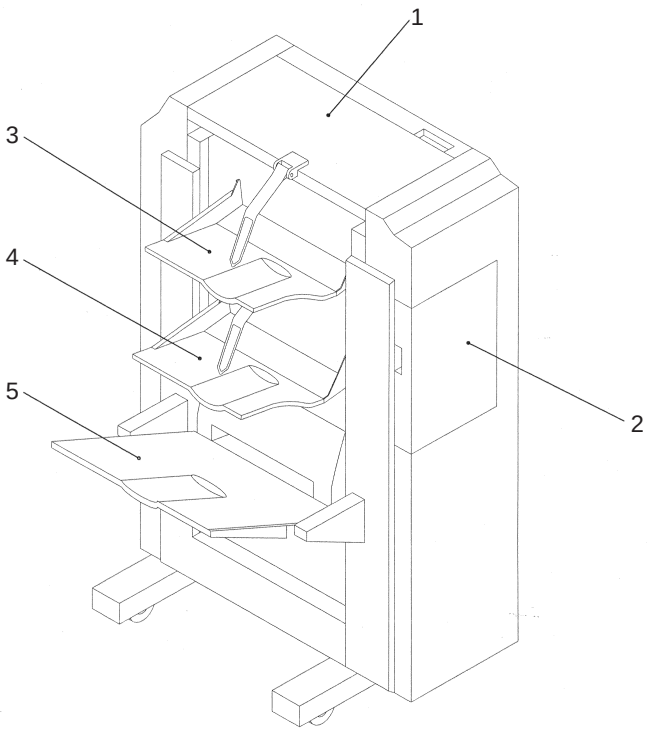
Connect the power cord, turn the main switch ON, and perform the following procedure.

12. Check the finisher operation.

- Check the operation in the STAPLE SORT mode.
  Make 10 sheets of copies in the STAPLE SORT mode.
  Check to see if the copies are stapled properly.

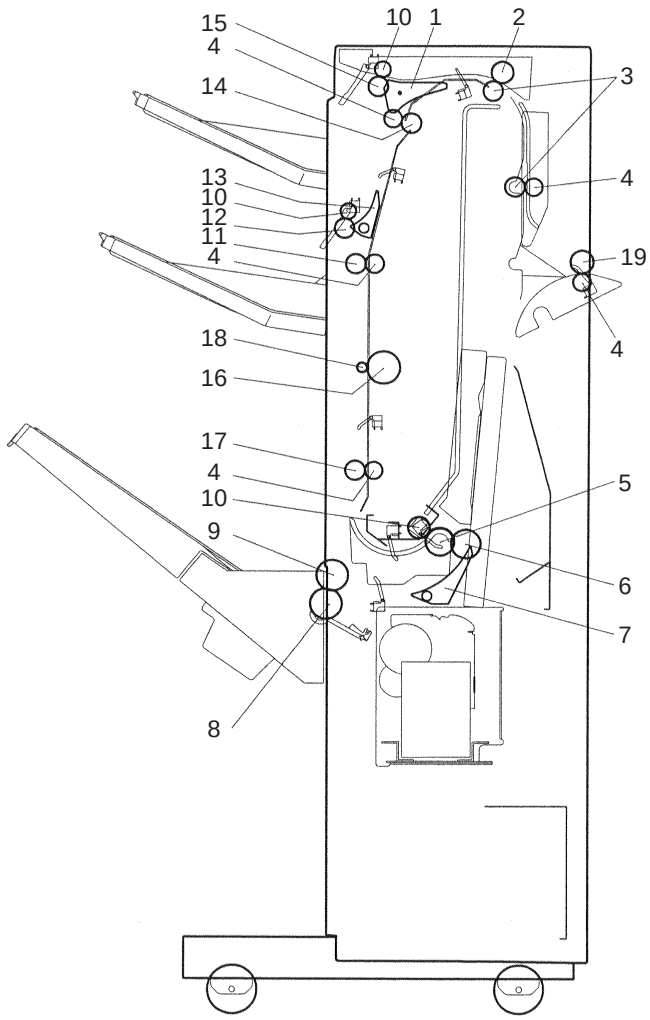
[3] EXTERNAL VIEW AND INTERNAL STRUCTURE

1. External view



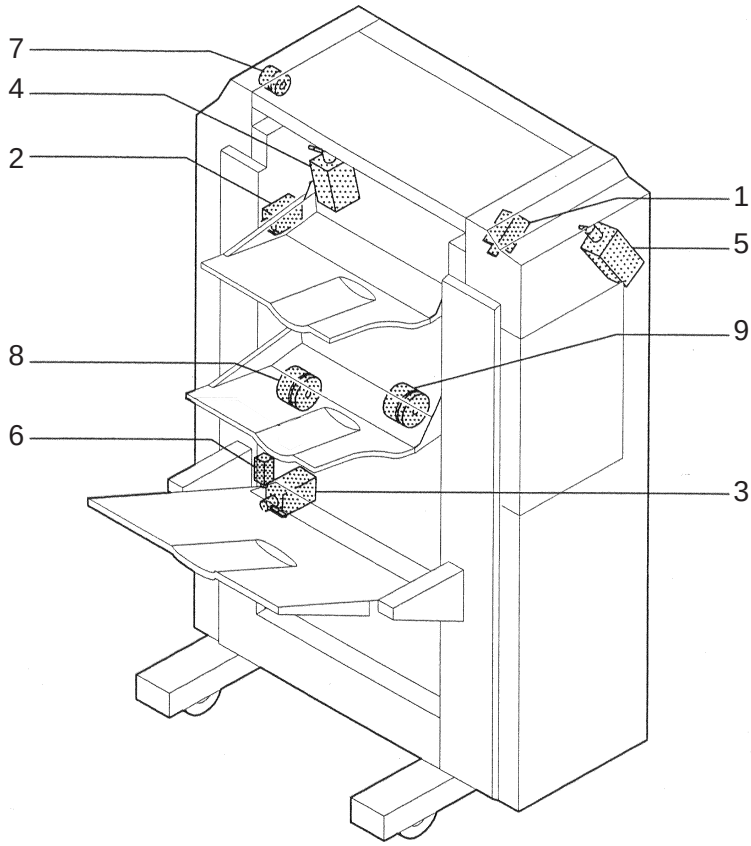
No.	Part name
1	Upper door
2	Front door
3	Tray 1
4	Tray 2
5	Tray 3

2. Internal structure



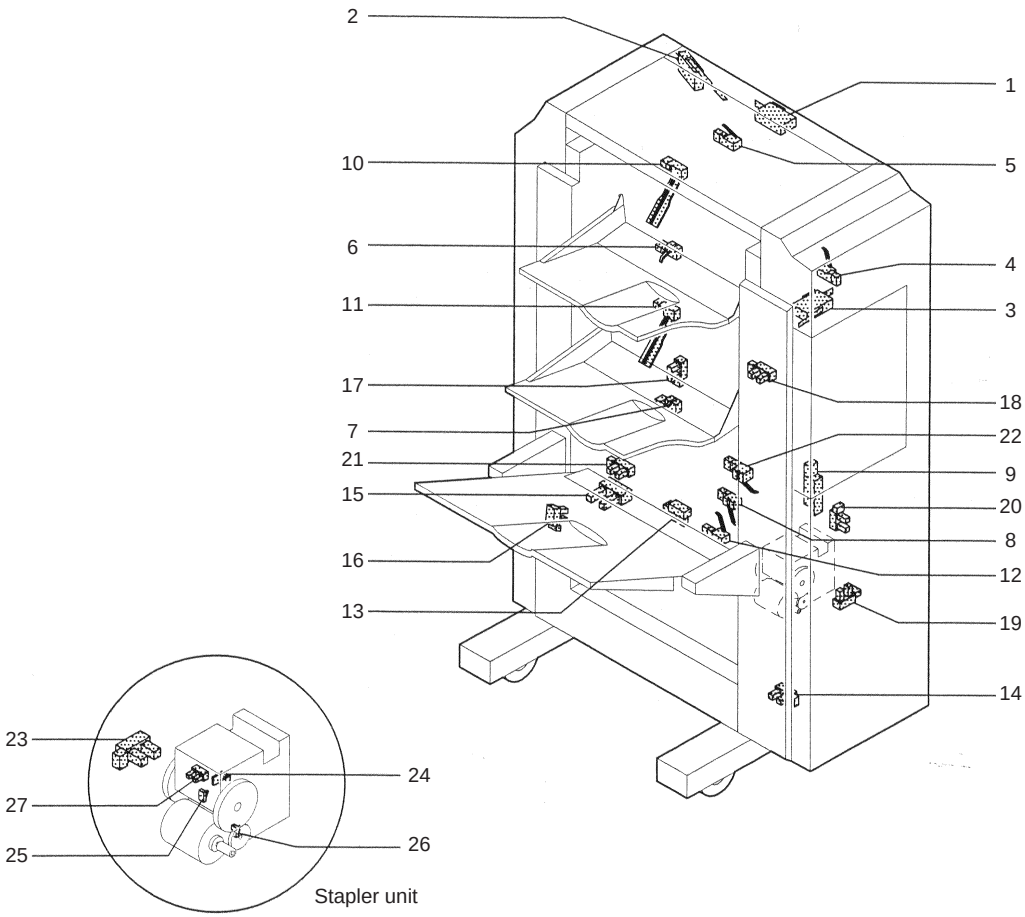
No.	Part name
1	Paper discharge gate 1
2	Transport follower roller 2
3	Vertical transport roller 1
4	Transport follower roller 1
5	S tray reverse roller 50
6	Paper discharge pressure release roller
7	Paper discharge gate 3 F50
8	Paper discharge roller 4
9	Paper discharge roller 3
10	Follower roller FN3
11	Vertical transport roller 3
12	Paper discharge roller 2
13	Paper discharge gate 2
14	Paper transport roller 2
15	Paper discharge roller 1
16	De-curler roller 50
17	Vertical transport 3 lower
18	De-curler vertical follower shaft
19	Paper entry roller F50

3. Clutch, solenoid



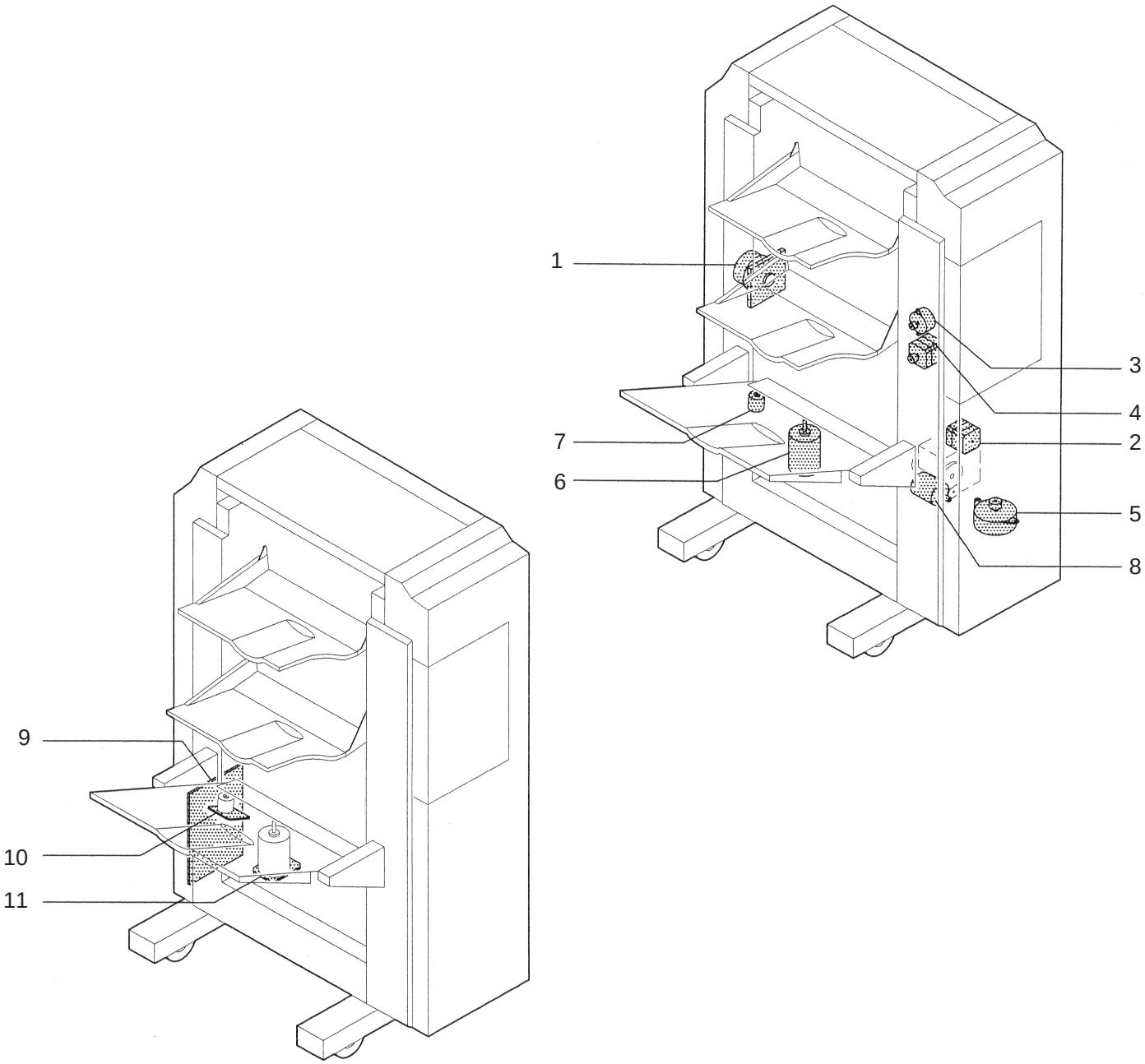
No.	Signal code	Name	Function and operation
1	OG1SL	Paper discharge gate solenoid 1	Switching tray 1 paper discharge gate
2	OG2SL	Paper discharge gate solenoid 2	Switching tray 2 paper discharge gate
3	OG3SL	Paper discharge gate solenoid 3	Switching tray 3 paper discharge gate
4	PPSL	Paper holding solenoid	Holding paper in staple tray
5	STSL	ST paper holding solenoid	Holding paper in staple tray
6	T3PDSL	Tray 3 paper discharge paddler solenoid	For tray 3 paper discharge paddler
7	T12CL	Tray 1 and 2 speed reduction clutch	Reducing speed of tray 1, 2 paper discharge roller
8	PDCL	Paddler clutch	For paddler in staple tray
9	STORCL	ST paper discharge roller pressure release clutch	Pressing staple tray paper discharge roller

4. Sensor



No.	Signal code	Name	Function and operation
1	DSW1	Copier connection switch	Detecting the finisher attached to the copier
2	DSW2	Top door opening switch	Detecting top door opening
3	DSW3	Front door opening switch	Detecting front door opening
4	INPD	Paper entry sensor	Detecting paper entry
5	PFD2	Transport sensor 2	Detecting paper transport 2
6	PFD3	Transport sensor 3	Detecting paper transport 3
7	PFD4	Transport sensor 4	Detecting paper transport 4
8	STID	Staple paper entry sensor	Detecting staple tray paper entry
9	STPD	Staple tray paper sensor	Detecting paper empty in staple tray
10	T1PF	Tray 1 full sensor	Detecting tray 1 full
11	T2PF	Tray 2 full sensor	Detecting tray 2 full
12	T3OD	Tray 3 paper discharge sensor	Detecting paper discharge in tray 3
13	T3UP	Tray 3 upper limit sensor	Detecting tray 3 upper limit
14	T3DN	Tray 3 lower limit sensor	Detecting tray 3 lower limit
15	EVRE	Elevator motor encoder	Elevator motor encoder
16	OFHP	Offset motor home position sensor	Detecting offset motor home position
17	JGHP	Jogger motor home position sensor	Detecting jogger motor home position
18	PSHP	Pusher motor home position sensor	Detecting pusher motor home position
19	STUHP	Staple unit moving motor home position sensor	Detecting staple unit moving motor home position
20	STORHP	ST paper discharge roller pressure release clutch home position sensor	Detecting ST paper discharge roller pressure release clutch home position
21	T3PDHP	Tray 3 paper discharge roller paddler home position sensor	Detecting tray 3 paper discharge roller paddler home position
22	STID2	Staple tray paper entry sensor 2	Detecting staple tray 2 paper entry
23	STND	Stapler replacement sensor	Detecting rotation of stapler for replacement of stapler
24	STHP	Stapler home position sensor	Detecting stapler home position
25	LSTS	Stapler sensor	Detecting staple in stapler unit
26	NCTS	Stapler cartridge sensor	Detection cartridge in staple unit
27	READY	Stapler self priming sensor	Detecting that stapler is at the position ready for stapling

5. Motor and PWB unit



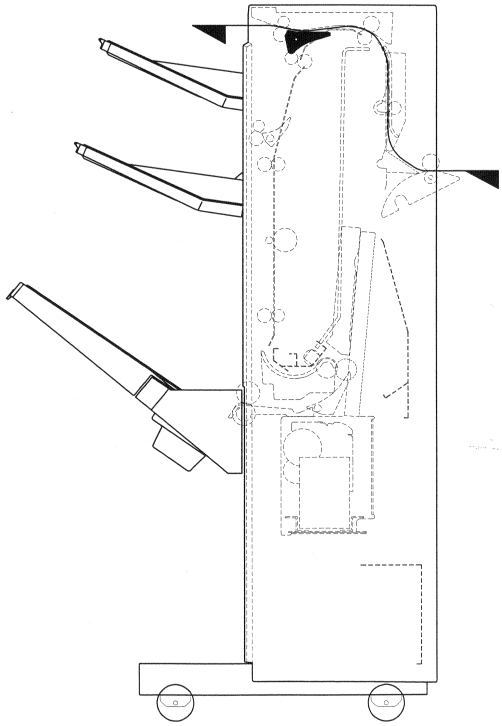
No.	Signal code	Name	Function and operation	Type
1	FM	Main drive motor	Transports paper in the finisher.	DC brushless
2	T3OM	Tray 3 paper discharge drive motor	Transports paper to tray 3.	DC stepping
3	JGM	Jogger motor	Sets the jogger position for each paper size to align paper in the staple tray.	DC stepping
4	PSM	Pusher motor	Lowers paper in the staple tray to the stapling position and lifts to the paper discharge position.	DC stepping
5	STUM	Staple unit moving motor	Moves the staple unit to the stapling position.	DC stepping
6	EVM	Elevator motor	Lifts and lowers tray 3 up and down.	DC brushless
7	OFM	Offset motor	Shifts tray 3 front and back to sort paper in tray 3.	DC brushless
8	STM	Staple motor	Drives the staple unit.	DC brushless
9	—	Finisher main PWB 100/200V	Finisher control	—
10	—	Filter PWB	Brush motor noise reduction	—
11	—	Filter PWB	Brush motor noise reduction	—

[4] OPERATIONAL DESCRIPTIONS

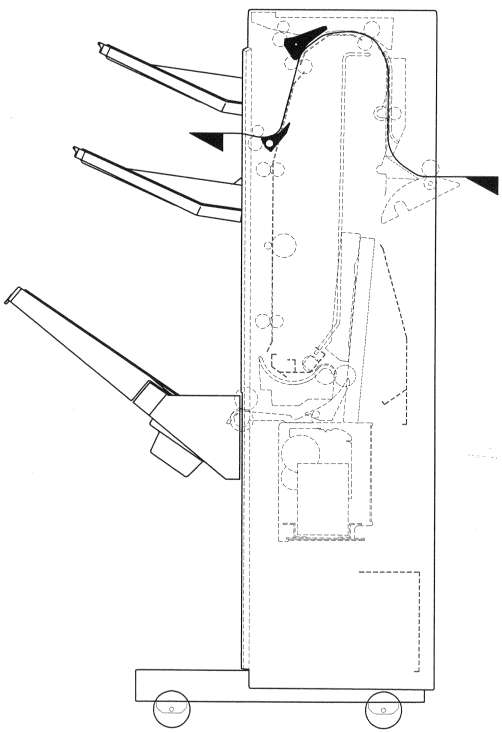
1. Transport route

The 3-tray finisher's transport routes are as follows.

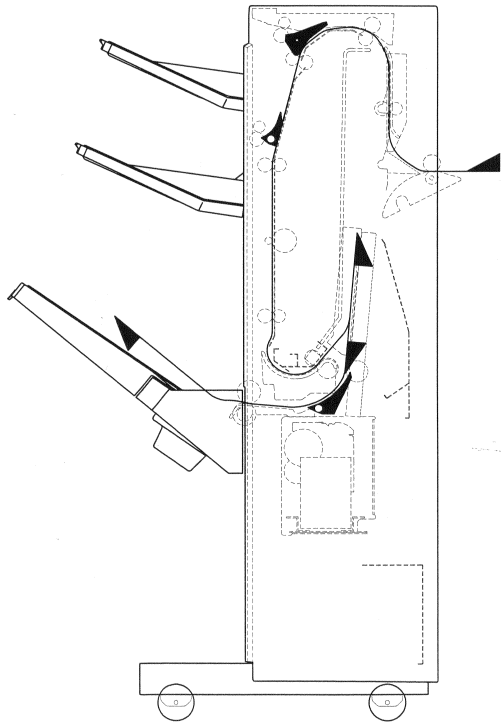
a) Tray 1 face-down paper discharge



b) Tray 2 face-down paper discharge



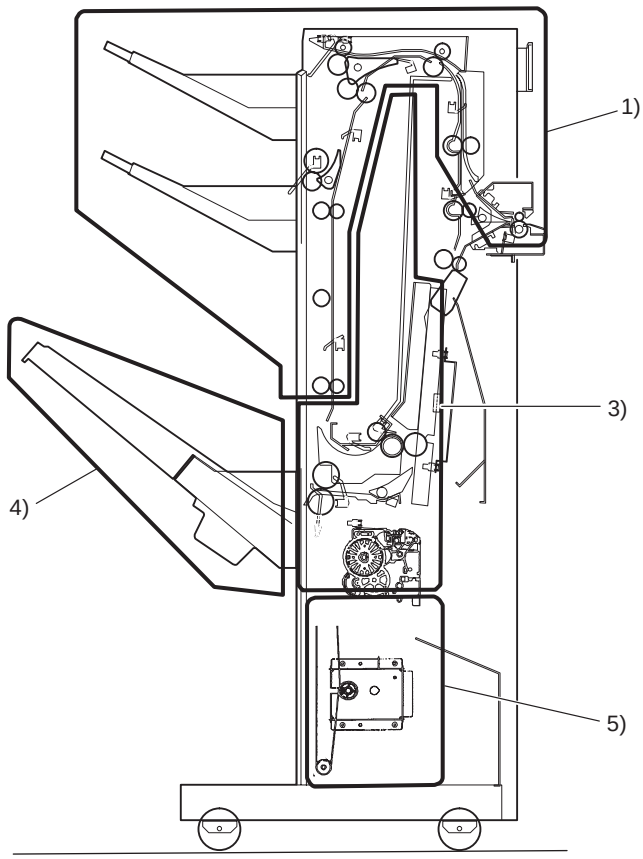
c) Tray 3 outside turn face-down paper discharge



2. Explanation of each section

The 3-tray finisher consists of (1) an upper paper transport section, (2) a reversion section, (3) a staple tray, (4) an offset tray, and (5) an elevator section.

It has the following functions: Paper discharge to a selected tray, paper reversion, stapling for paper delivered to the offset tray (3 positions), offset, and elevation. Each function is performed according to the mode instructed by the copier.



A. Upper paper transport section

1) Paper transport

By rotating the main driving motor (FM), the transport rollers in the finisher are driven.

2) Paper discharge gate 1 (1)

The paper discharge gate 1 (1) is operated by the paper discharge gate 1 solenoid (OG1SL), to select between the routes for paper discharge to the tray 1 (8) and transport to the tray 2 (5)/staple tray.

3) Paper discharge gate 2 (6)

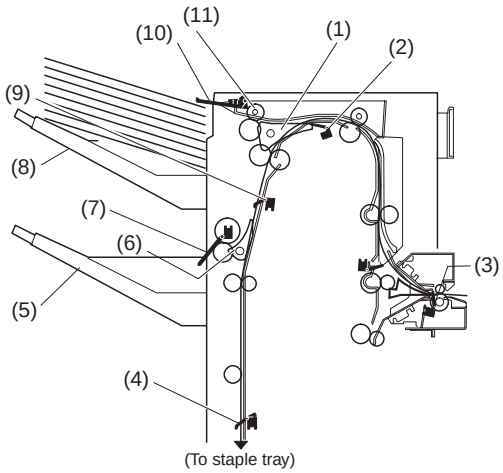
The paper discharge gate 2 (6) is operated by the paper discharge gate 2 solenoid (OG2SL) to select between the routes for paper discharge to the tray 2 (5) and transport to the staple tray.

4) Trays 1 (8) and 2 (5) paper discharge operation

When paper is discharged to tray 1 (8) and tray 2 (5), tray 12 reduction clutch (11) is operated at the paper discharging timing to reduce the speed of paper discharge rollers 1 and 2, improving the accuracy of paper alignment in tray 1 (8) and tray 2 (5).

5) Trays 1 (10) and 2 (7) paper full detection

Whether the trays 1 (10) and 2 (7) are filled with paper is detected by the tray 1 and 2 paper full sensor.



No.	Signal name	Name
(1)	—	Paper discharge gate 1
(2)	PFD2	Transport sensor 2
(3)	INPD	Paper entry sensor
(4)	PFD4	Transport sensor 4
(5)	—	Tray 2
(6)	—	Paper discharge gate 2
(7)	T2PF	Tray 2 paper full detecting sensor
(8)	—	Tray 1
(9)	PFD3	Transport sensor 3
(10)	T1PF	Tray paper full sensor
(11)	T12CL	Trays 1 and 2 deceleration clutch

B. Staple tray

1) Jogger motor (JGM)

The jogger motor is driven when the paper is fed into the staple tray, to operate the jog plates F and R so as to align the sideways edge of the paper.

2) Paddler (11)

The paddler clutch (PDCL) is turned ON when the paper is fed into the staple tray, to give the paddler a full turn so as to drop the paper downward (pusher), thus achieving alignment in the vertical direction.

3) Pusher motor (PSM)

With the pusher motor rotating, the paper stored inside the staple tray is lowered from the home position (discharge position) to the stapling position; after stapling, the paper inside the staple tray is elevated from the stapling position to the home position.

4) Staple unit movement motor (STUM)

The staple unit is moved to the stapling positions (front, far end, 2 centers) by the staple unit motor.

5) Staple tray paper discharge

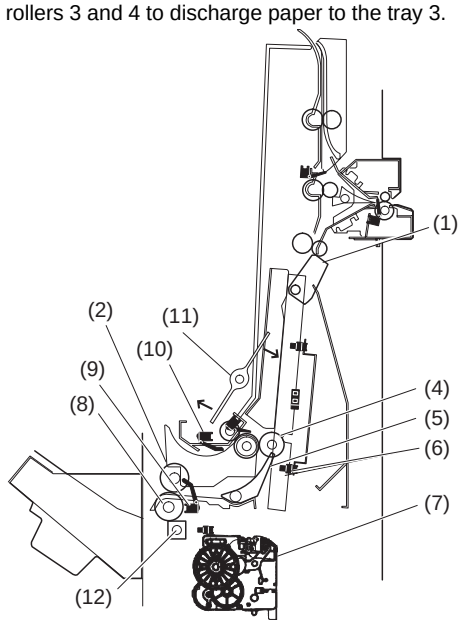
When the paper delivery roller pressure release clutch (STORCL) is turned ON, the paper delivery pressure release roller (4) is pressurized through the cam to discharge the paper from the stable tray.

6) Paper discharge gate 3 (5)

The paper discharge gate 3 (5) is operated by the paper discharge gate 3 solenoid (OG3SL) to switch over the routes of paper inside the staple tray between the paper discharge side and the staple side of the off-set tray.

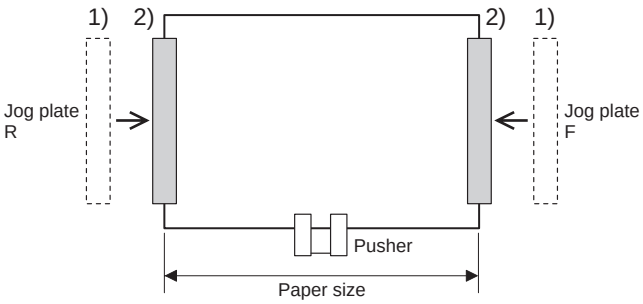
7) Tray 3 paper discharge motor

The tray paper discharge motor (12) is rotated to drive the paper discharge rollers 3 and 4 to discharge paper to the tray 3.



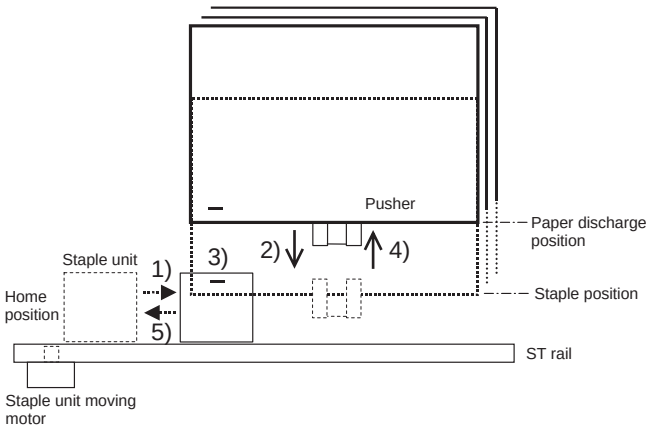
No.	Signal name	Part name
(1)	—	Short path switching gate
(2)	—	Paper discharge roller 3
(3)	—	Pusher
(4)	—	Paper delivery pressure release roller
(5)	—	Paper discharge gate 3
(6)	STPD	Staple tray paper detection sensor
(7)	—	Staple unit
(8)	T3ORSL	Paper discharge roller 4
(9)	T3OD	Tray 3 paper discharge sensor
(10)	STID	Staple tray paper entry sensor
(11)	—	Paddler
(12)	T3OH	Tray 3 paper discharge motor

(Operation of stapling)



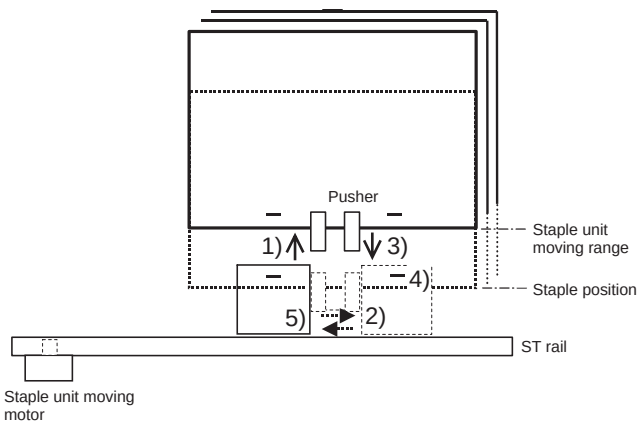
Jogging in lateral direction

1) The jog plates are moved to the stand-by position before the paper is fed to the staple tray.
2) Immediately after the paper is fed into the staple tray, the jog plate is moved to the paper size position to ensure the alignment of the paper.



Staple unit movement at the time of stapling (1-point stapling)

1) The stapler unit is moved to the stapling position.
   – The number of sheets to be stapled is fed to the staple tray –
2) The pusher (the sheets to be stapled) is lowered to the stapling position.
3) The paper is stapled ... (in the case of 2-point stapling, the action that is described on the following page is added.)
4) The pusher (the sheets stapled) is elevated to the paper discharge position.
5) After the job, the stapler unit is returned to the home position.



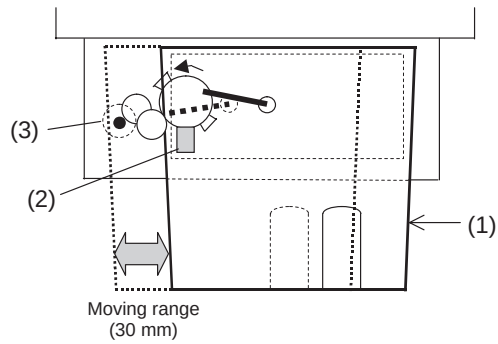
Stapler unit movement at the time of stapling (2-point stapling action is added.)

1) The pusher is elevated to the position which makes it possible for the staple unit to move.
2) The staple unit is moved to the staple position where the 2nd staple is driven.
3) The pusher (sheets to be stapled) is lowered to the stapling position.
4) Sheets are stapled.
5) The staple unit is returned to the 1st staple position.
   (After the job is finished, the staple unit is returned to the home position.)

D. Off-set tray

1) Off-set motor (3)

When the off-set motor (3) is driven, the tray is shifted sideways against the direction in which the sheets are delivered, so that the sheets discharged into the off-set tray (1) are sorted by the specified number of sheets. The rotation is unidirectional and controlled by the crank. The motor is stopped by the off-set home position sensor (2) turning ON.



No.	Signal name	Part name
(1)	—	Tray 3 (Off-set tray)
(2)	OFHP	OFHP Off-set home position sensor
(3)	OFM	Off-set motor

E. Elevator

1) Elevator motor (3)

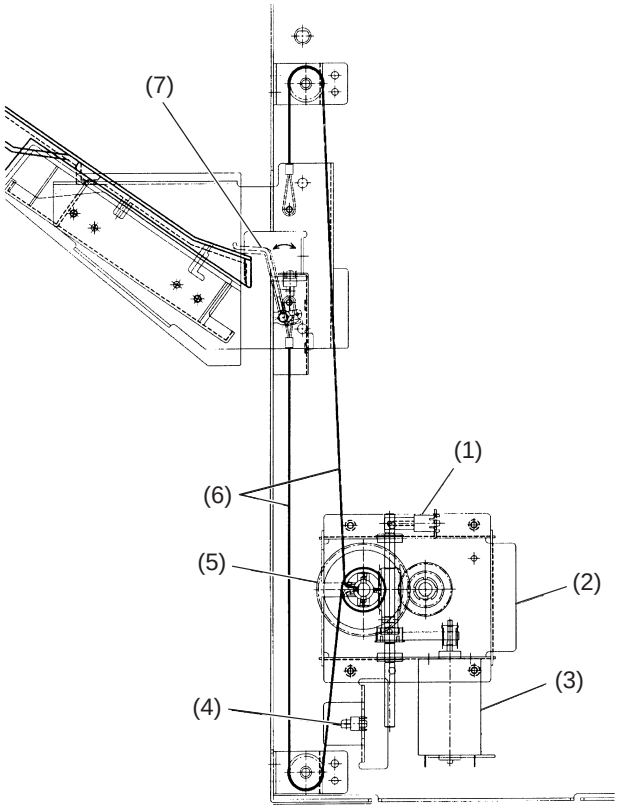
When the elevator motor (3) is driven, the winding pulley (5) is rotated in both forward and reverse to wind up the wire (6) stretching vertically so that the tray 3 (off-set tray) is moved up and down. This allows the discharge of paper at a fixed position according to the number of sheets to be loaded on the off-set tray.

2) Off-set tray full and load detection

When the power is turned ON, the off-set tray lowers to the lower limit sensor (4) position. Then it elevates until the upper limit sensor (7) turns ON, while counting the encoder pulses of the elevator motor (3).

The volume of paper loaded on the off-set tray is calculated (0 - 100%) by counting the number of pulses from the elevator encoder (1).

The off-set tray is judged to be full when both the lower and upper limit sensors (4), (7) are turned ON.



No.	Signal name	Part name
(1)	—	Elevator motor encoder
(2)	—	Elevator drive unit
(3)	EVM	Elevator motor
(4)	T3DN	Tray 3 lower limit sensor
(5)	—	Winding pulley
(6)	—	Wire
(7)	T3UP	Tray 3 upper limit sensor

3. Basic operation

A. Basic operation flowchart

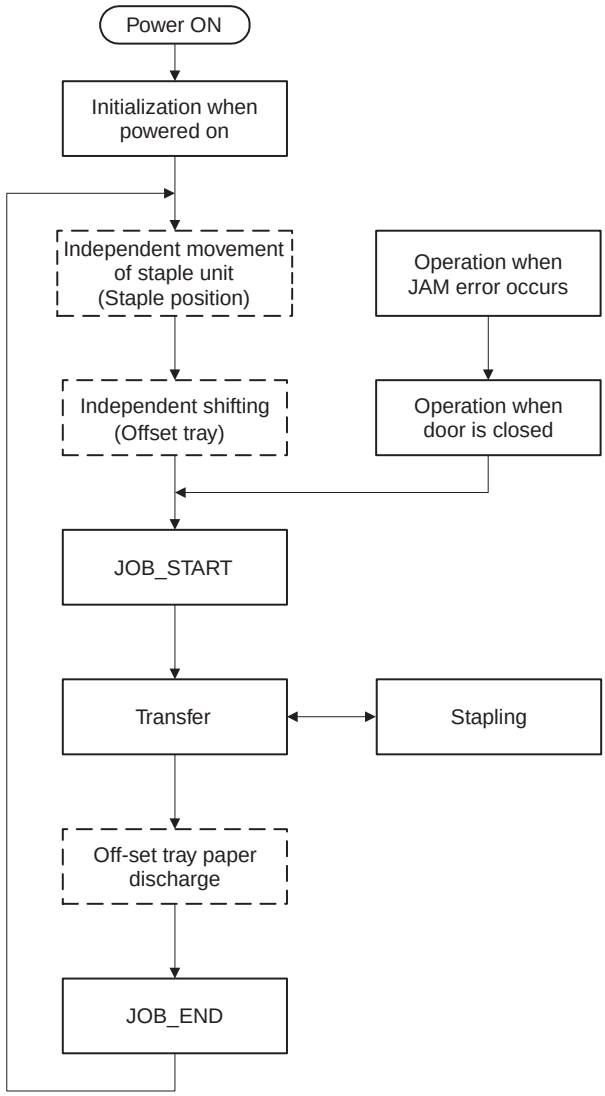


Fig. 1 Basic operation flowchart

1) Initialization

The finisher is initialized (home positioning of each motor) at the following timing.

- When the power is turned on.
- The finisher leaves the copier and when either of the top or bottom doors are opened.
- When the copier start key is pressed (JOB_START):
- Recovery action is performed.

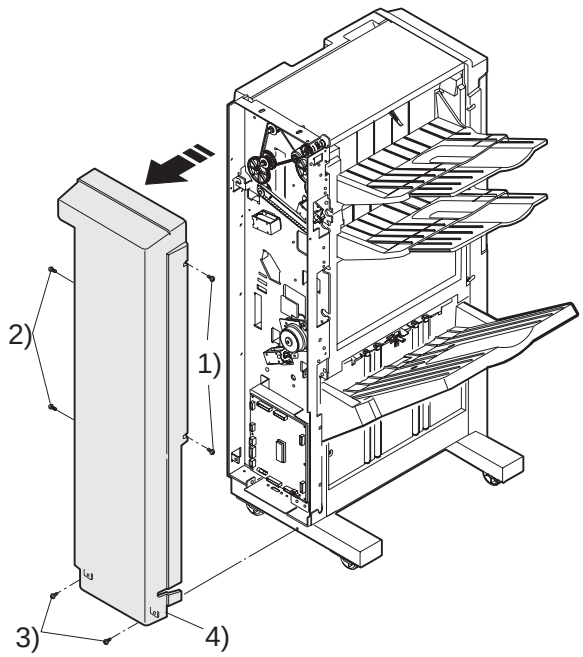
[5] DISASSEMBLY AND ASSEMBLY

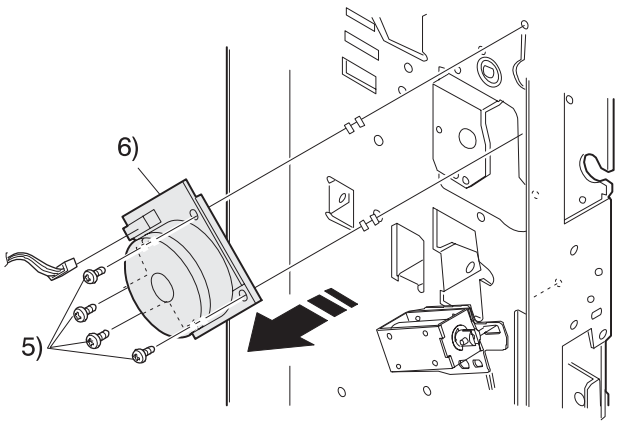
[Note]

- This section explains the procedure for disassembling and reinstalling the unit. Reinstall the unit in the reverse order of disassembly.
- Disassemble the unit in numerical order in each sketch.
- This section covers the procedure for disassembling the following major parts. For the other parts, refer to the Parts Guide.

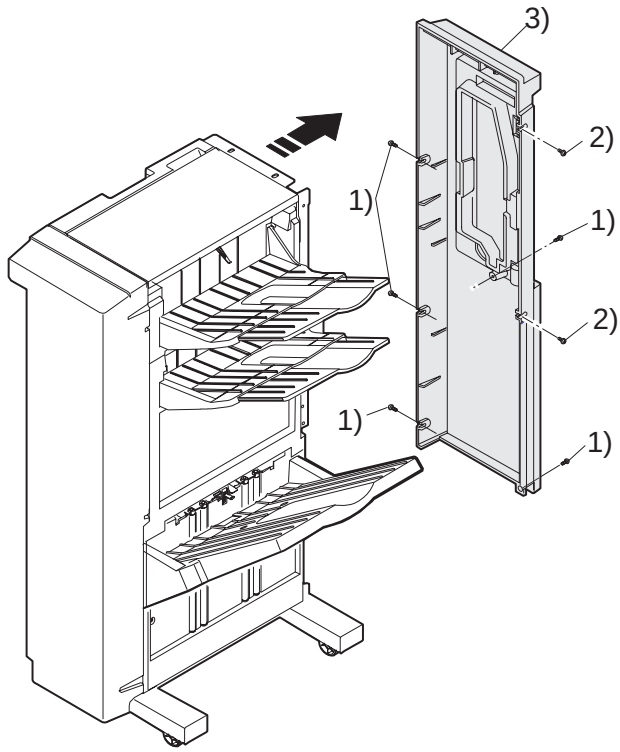
No.	Part name
1	Main drive motor
2	Staple unit movement motor
3	Elevator motor
4	Off-set motor
5	Stapler
6	Jogger motor
7	Pusher motor
8	Elevator wires, top and bottom
9	Paper discharge roller 3

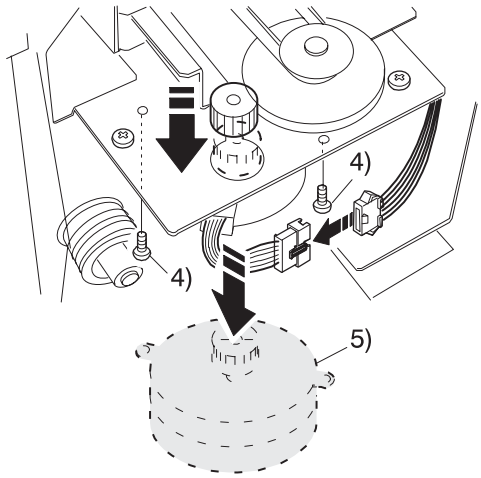
1. Main drive motor



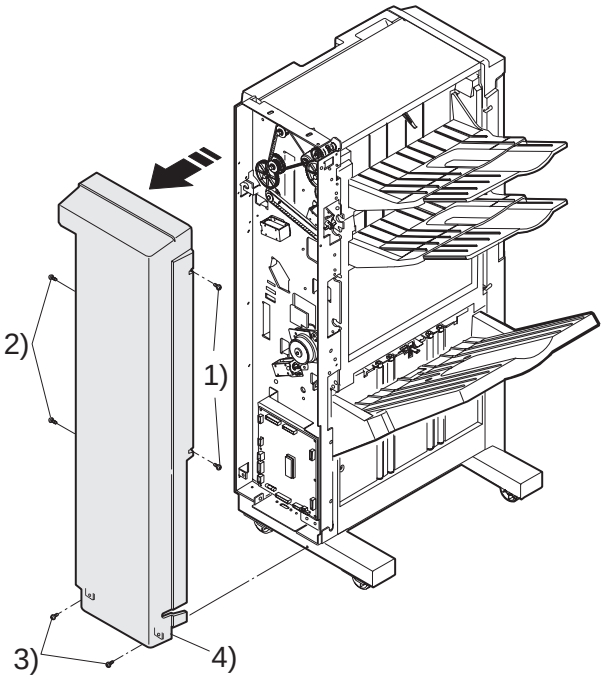


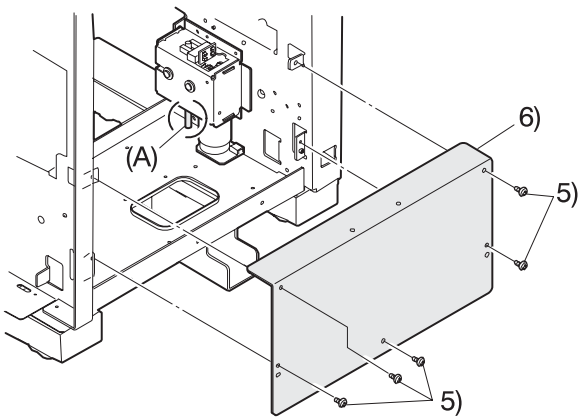
2. Staple unit movement motor



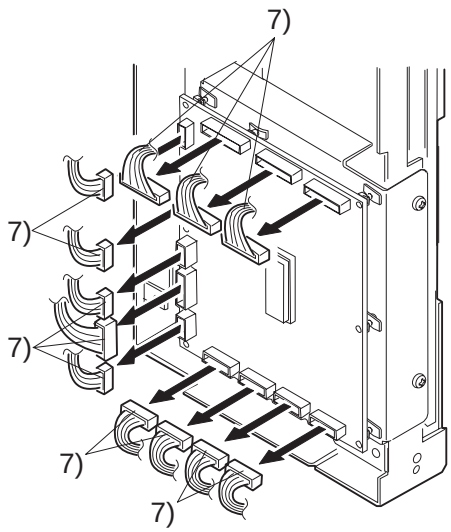


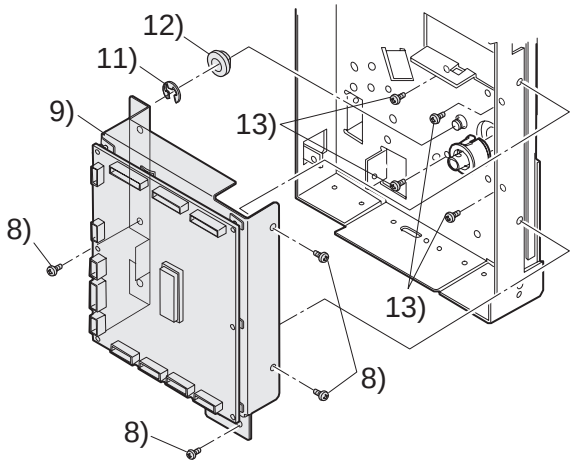
3. Elevator motor

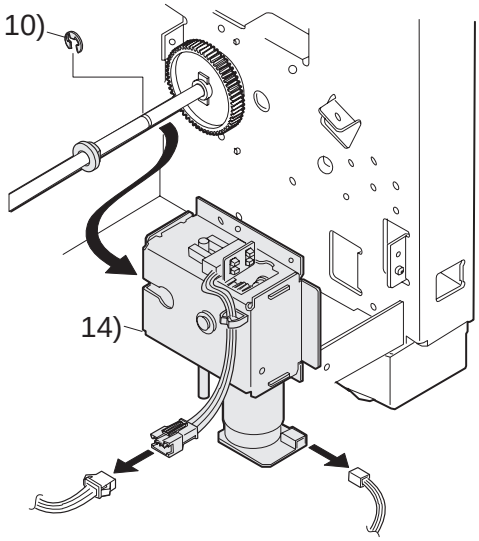


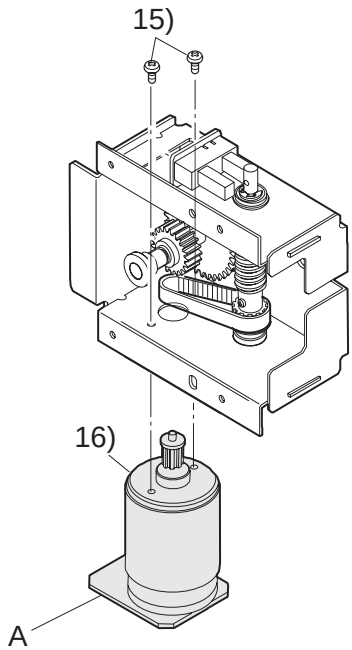


[Note] Before removing the lower cover on the FN3, make sure the tray 3 is at the upper limit position.
If the tray 3 is not at the upper limit position, turn the knurled part on the shaft (A) in the sketch and move the tray 3 to the upper limit.



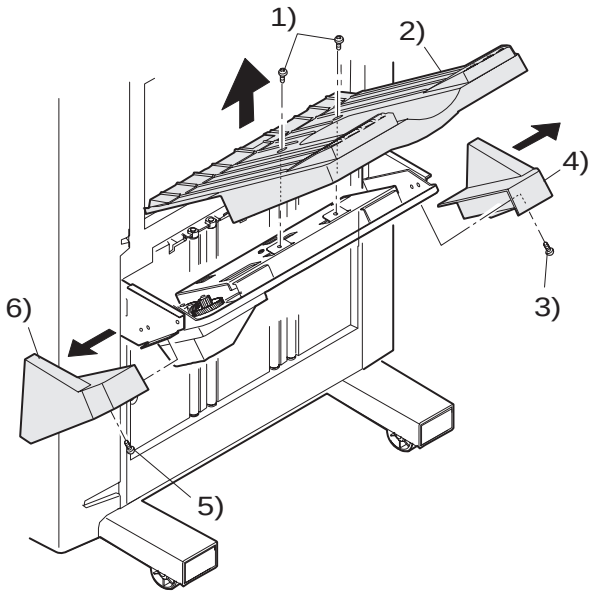


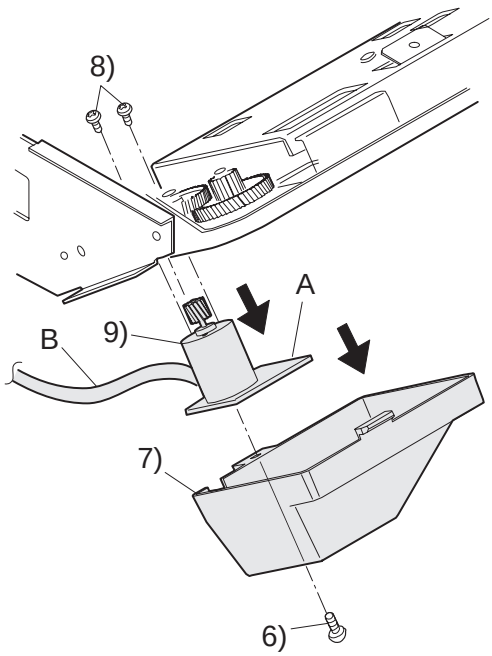




[Note] When setting the elevator motor 16), pay attention to the direction of the filter PWB A. For the direction, see the sketch given above.

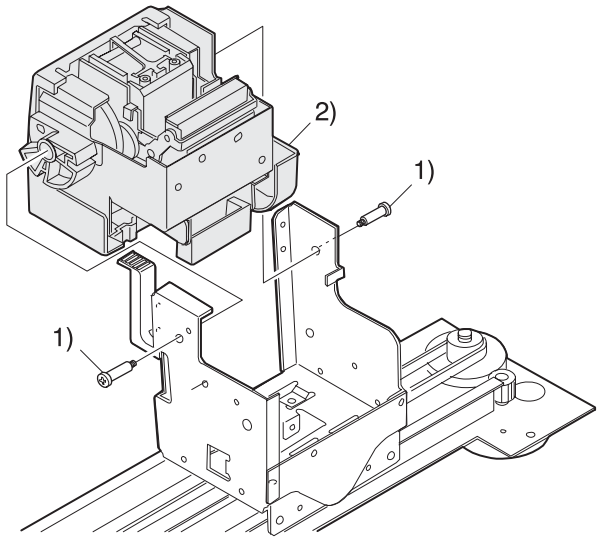
4. Off-set motor

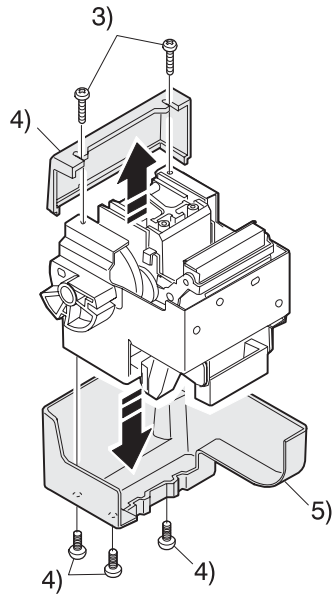


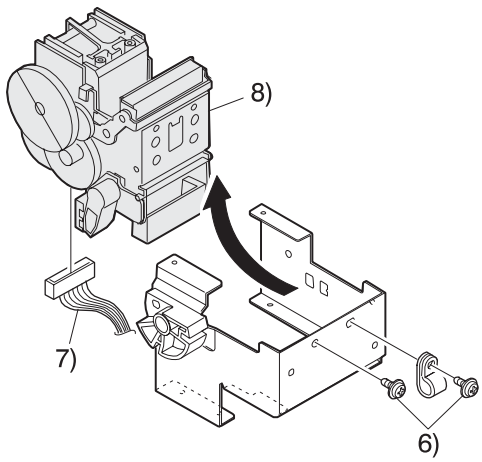


[Note] When setting the tray 3 cover (bottom), use caution not to get the wire caught in the harness B.
When setting the off-set motor 9), pay attention to the filter PWB A. For the direction, see the sketch given above.

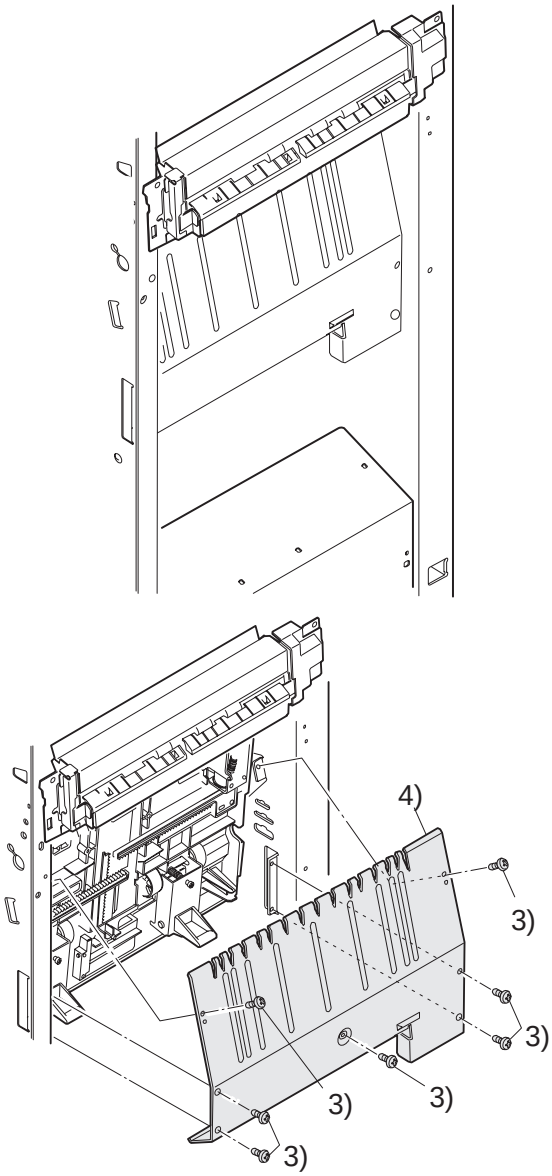
5. Stapler





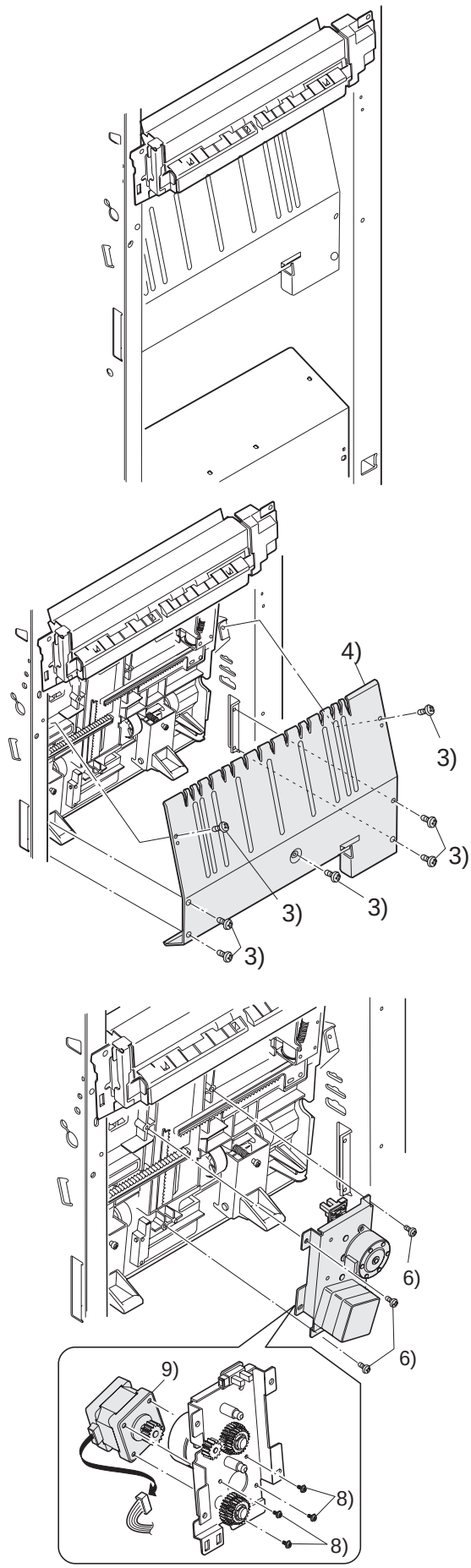


6. Jogger motor

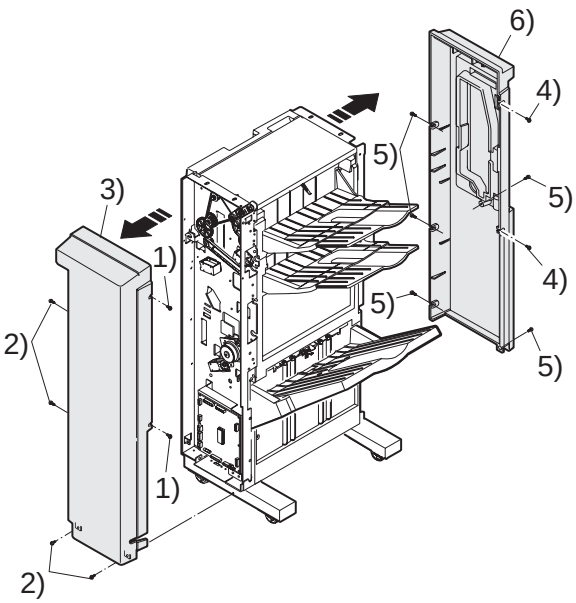


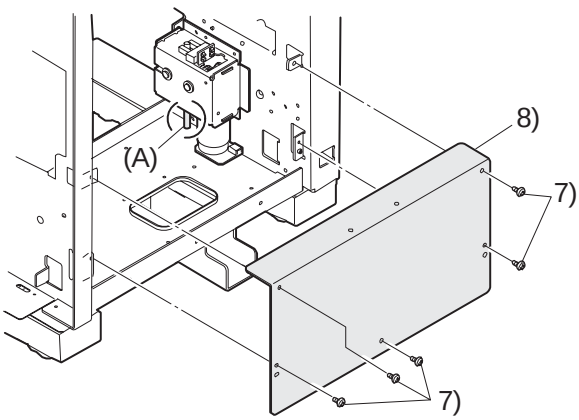
[Note] When installing the jogger motor 6), pay attention to the harness pulling-out direction. See the sketch given above.

7. Pusher motor

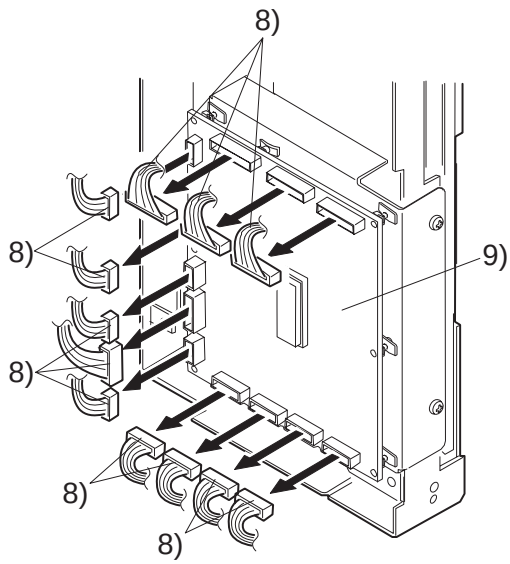


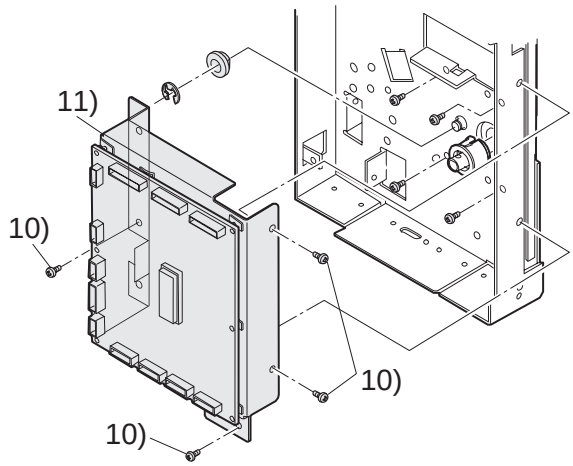
8. Elevator wires, top and bottom

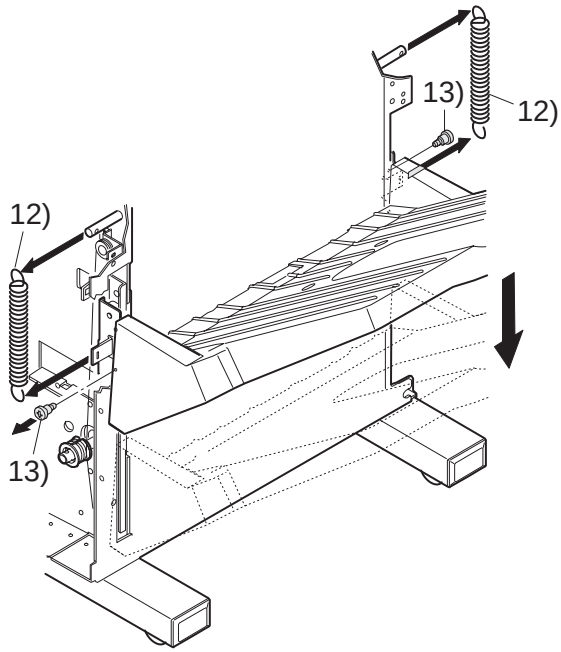




[Note] If the tray 3 is not at the upper limit position, turn the knurled part on the shaft (A) in the sketch and move tray 3 to the upper limit position.

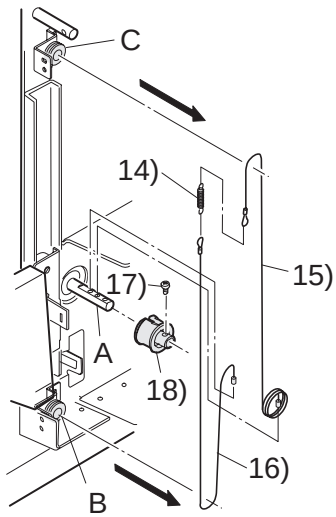






[Note] Remove the two screws 13) and:

1) Move the off-set tray to the lower limit position.
2) Turn the knurled part on the elevator worm gear shaft under the elevator drive box so that the D-cut surface on the winding pulley points upward.



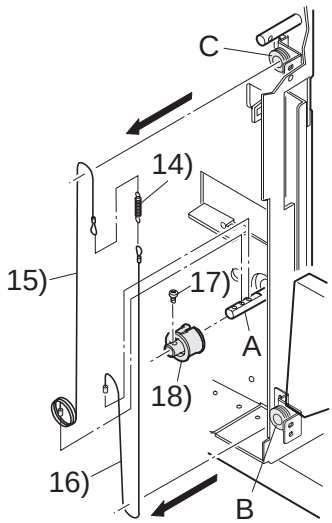
[Note] Remove the elevator wires (top, bottom) at the rear frame side in the same manner.

[Reinstalling elevator wires (top, bottom) at the front frame side]

1) Insert both the top elevator wire 15) and bottom elevator wire 16) into the elevator pulley drive shaft A. Secure the winding pulley 18) with the screw 17).
2) Hook the bottom elevator wire 16) on the lower wire roller B from the left side of the winding pulley 18), without giving extra winding. With the wire extended upward, hook the wire mounting spring 14) on the wire hook.
3) Wind the top elevator wire 15) onto the winding pulley 18) and turn 3 and 3/4 turns in the clockwise direction and hook on the upper wire roller C. Hold it stretched downward.
4) When setting the top and bottom elevator wires at the rear frame side (see the sketch below), observe the following conditions:

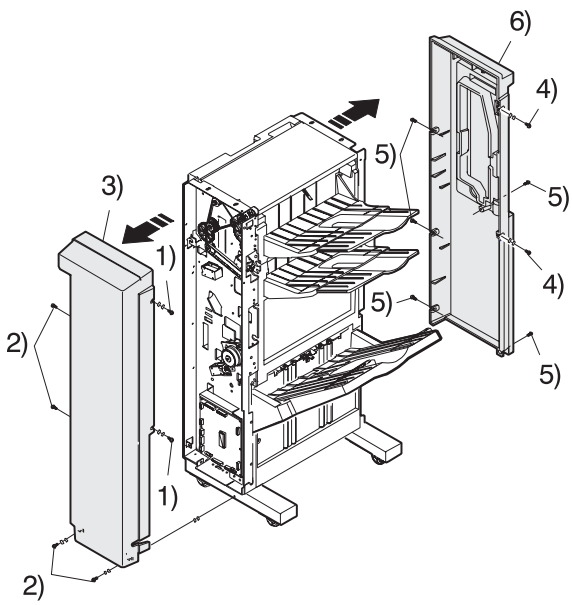
[Note] Observe the following conditions when setting elevator-wires (top and bottom) at the rear frame side. See the sketch below.

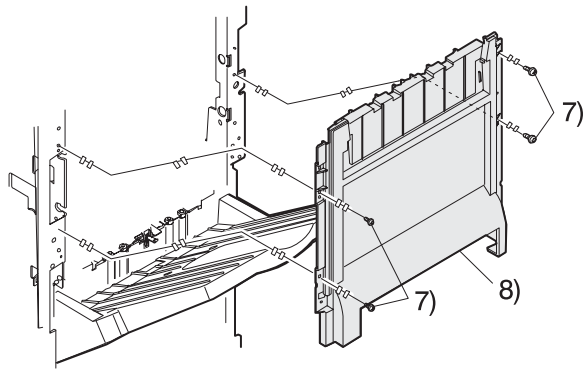
- The bottom elevator wire 16) should be hooked onto the bottom wire roller B from the right side of the winding pulley 18) without giving extra winding.
- The top elevator wire 15) should be wound onto the winding pulley 18) 3 and 3/4 turns in the counterclockwise direction.

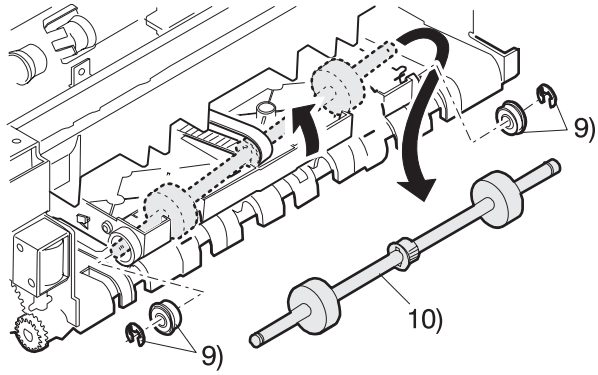


9. Paper discharge roller 3

9-1. Paper discharge roller 3 (top)

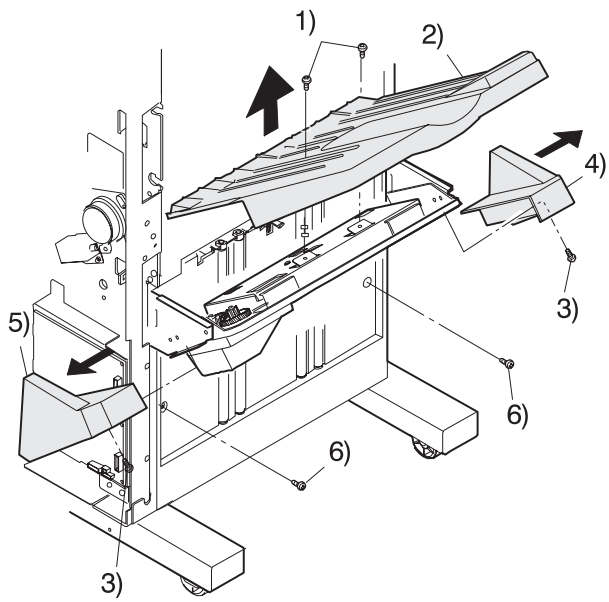


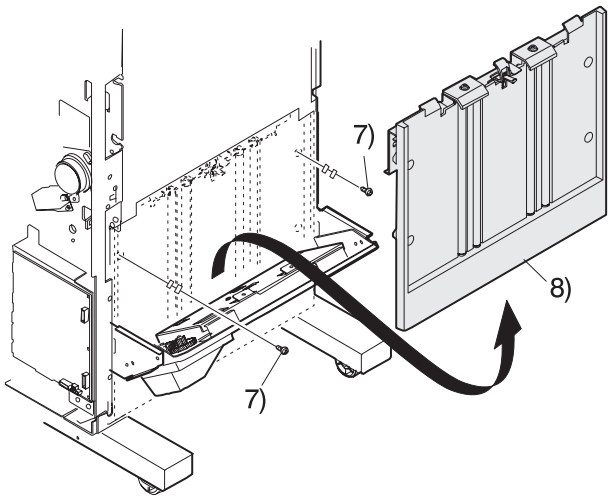


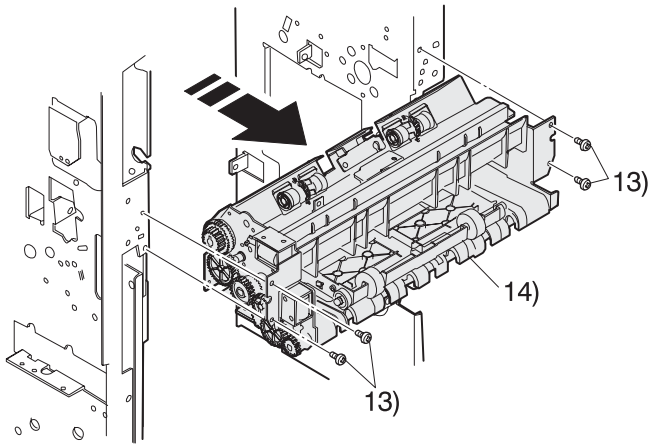


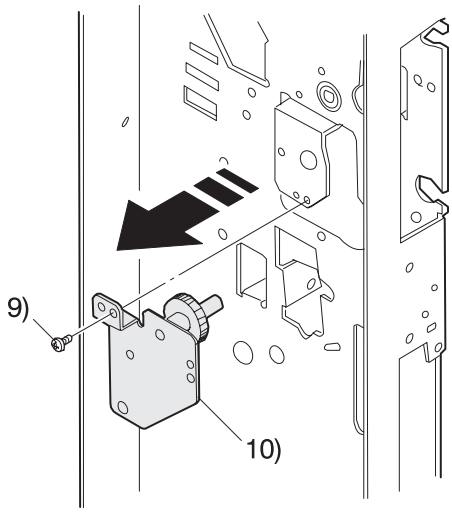
[Note] After removing the E-ring, slide the bearing A in the direction A to remove the paper discharge roller 3.

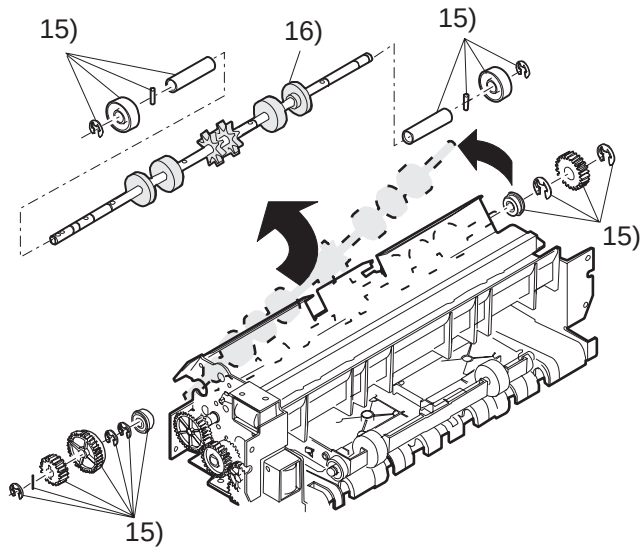
9-2. Paper discharge roller 3 (bottom)

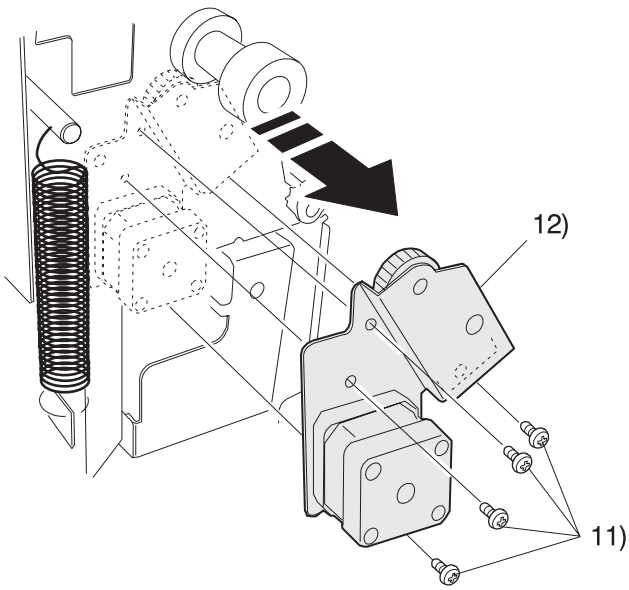



7)
8)
7)


13)
14)
13)


9)
10)


15)
16)
15)
15)
15)


12)
11)

[6] ADJUSTMENTS

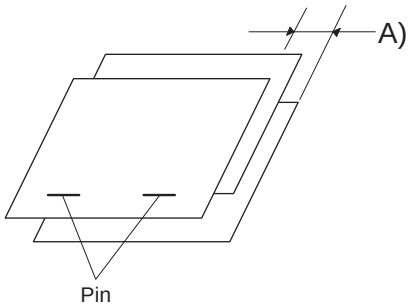
The following table shows the main parts requiring adjustment at the time of replacement

Item	Part name
1	Jogger F/R
2	Paper discharge gate solenoid 1
3	Paper discharge gate solenoid 2
4	Paper discharge gate solenoid 3
5	Paper holding solenoid
6	Paddler clutch
7	Vertical transport de-curler

Note: Remove or install parts in numerical order shown in the following figures.

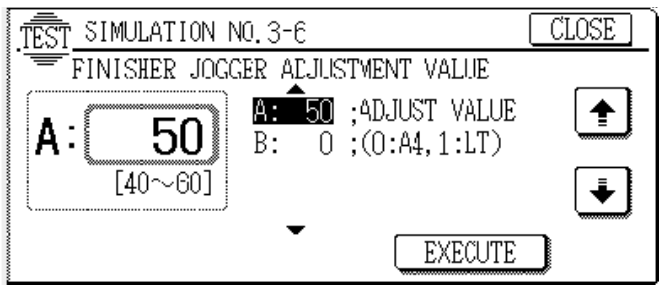
1. Jogger F/R

A. Let the unit staple 5 sheets of A4 or letter paper and check the bundle of the sheets for deviation in directions A).



B. If the deviation in directions A) are within 1 mm, there is no need to adjust the jogger F/R.

C. When the deviation exceeds 1 mm, adjust the jogger F/R according to the simulation 3-6: Adjusting Finisher Jogger Position.



Sim. 3-6: Adjusting Finisher Jogger Position

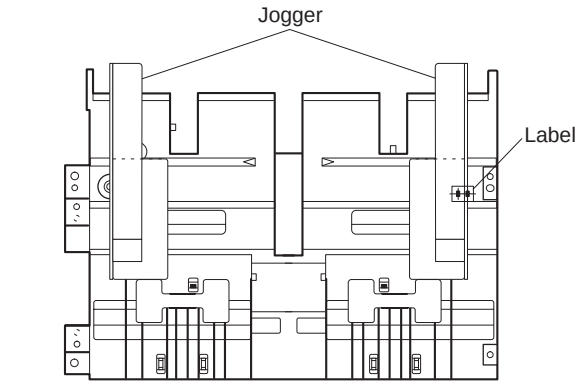
The screen above is displayed after the sub number of the simulation is entered.

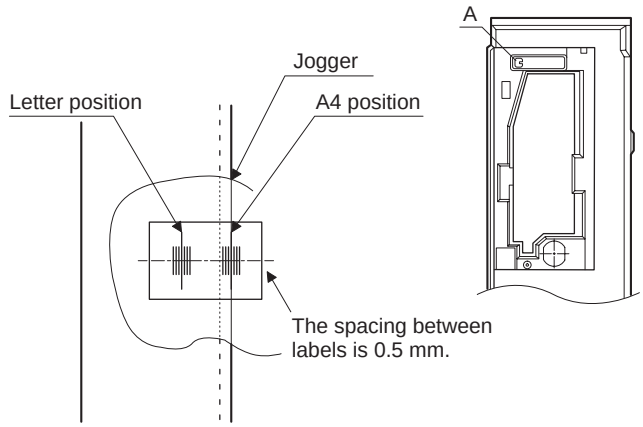
1) Adjust the value with the numeric keypad.

2) The joggers in the finisher are operated by pressing the [EXECUTE] key. The [EXECUTE] key is displayed in reverse video during loading operation. When the [EXECUTE] key in this state is pressed, loading operation can be canceled.

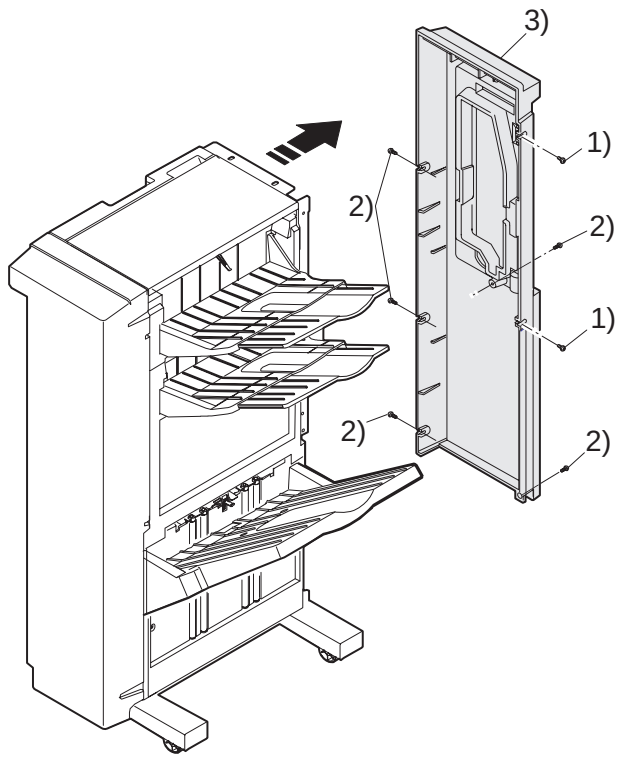
	Condition	Adjusting procedure
1	When the deviation in the direction A) exceeds 1 mm.	Decrease the simulation value. (Decreasing the simulation by 1 narrows the width between the joggers by 0.63 mm.)
		Increase the simulation value. (Increasing the simulation value by 1 widens the width between the joggers by 0.63 mm)

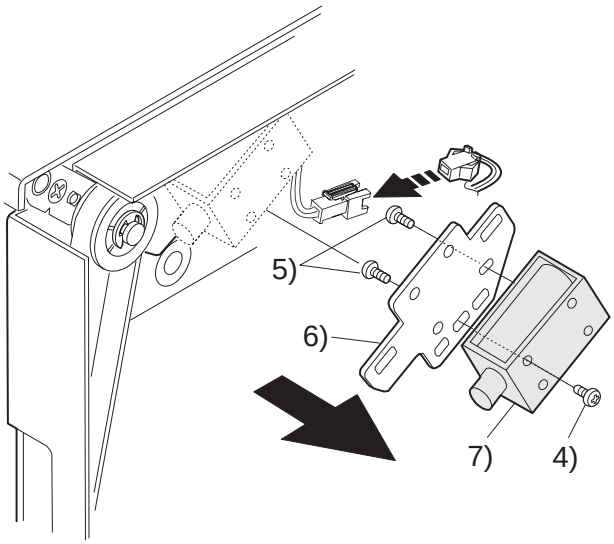
Note: The width between joggers can be visually checked by observing the label inside the staple tray.





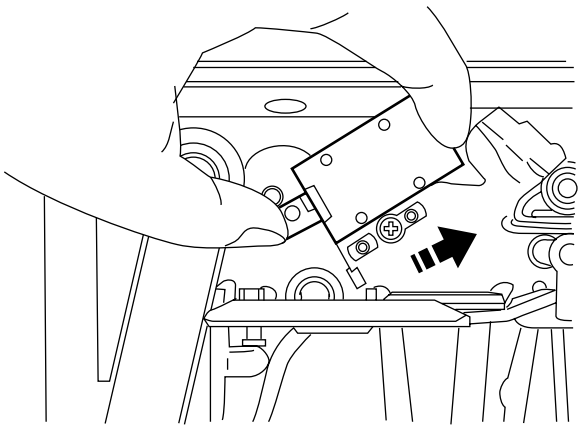
2. Paper discharge gate solenoid 1



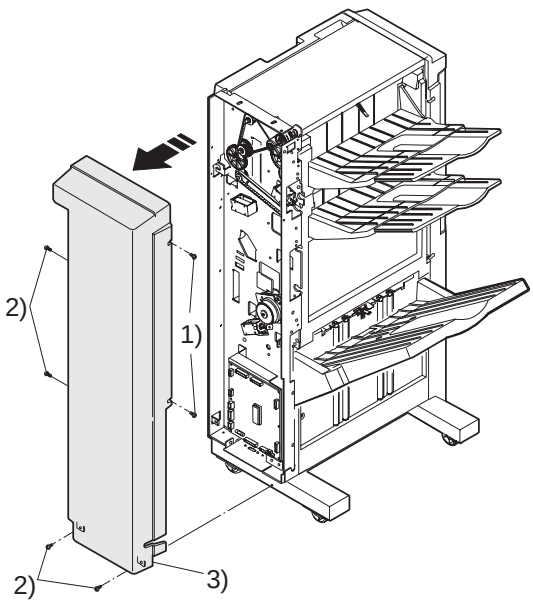


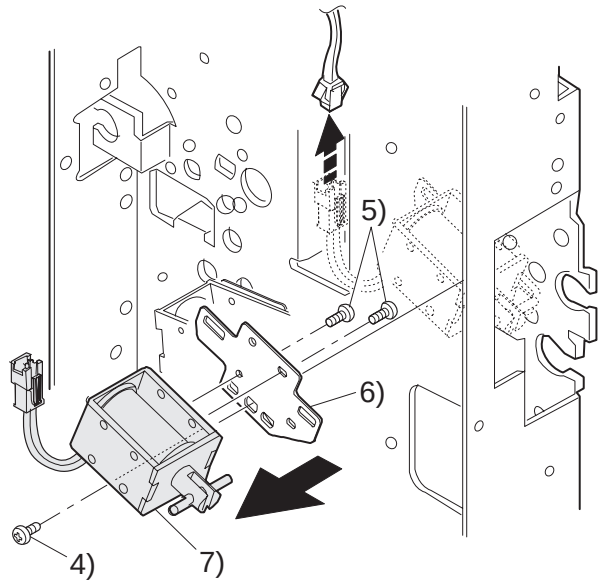
[Adjustment and precaution in setting]

Manually pull the plunger to move it in the arrow direction until it stops, and fix it at that position.



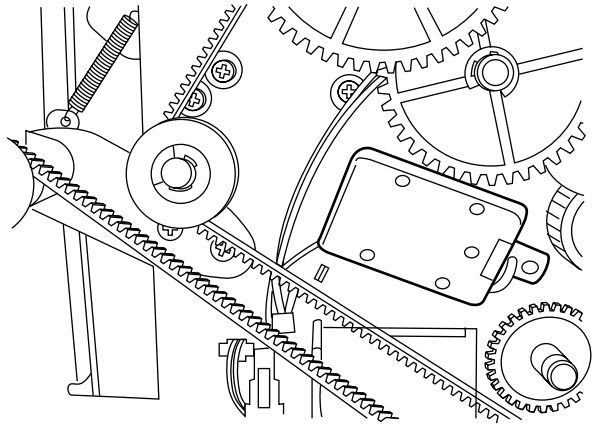
3. Paper discharge gate solenoid 2



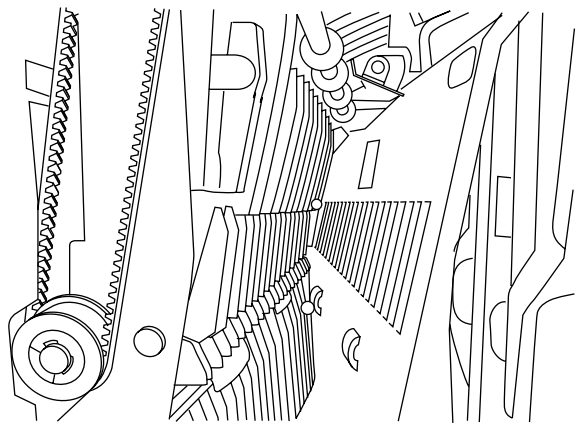


[Adjustment and precaution in setting]

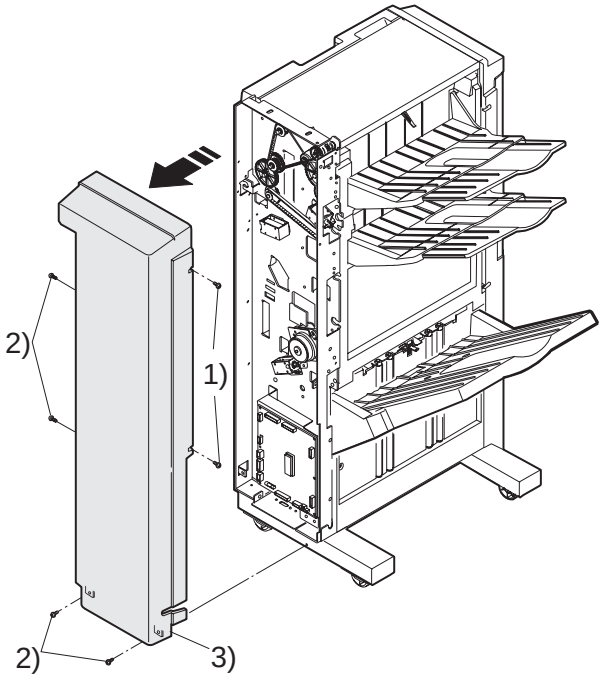
Fit the edge of plate to which the solenoid is attached, with the left edge of the marking.

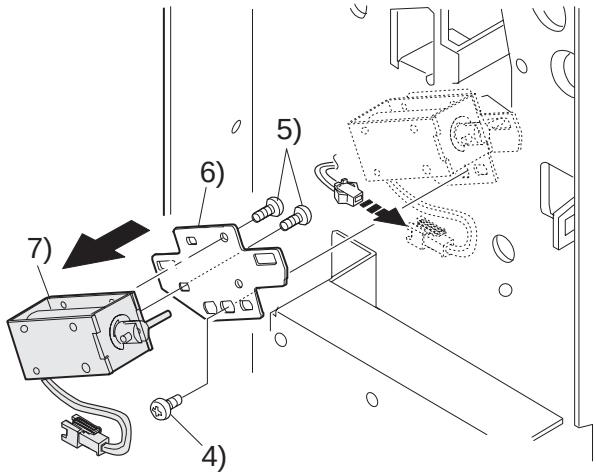


At that time, check that the rib of the paper discharge gate 2 and the rib inside the left cabinet 1 are aligned on a line as shown in the figure with the solenoid pulled completely.



4. Paper discharge gate solenoid 3

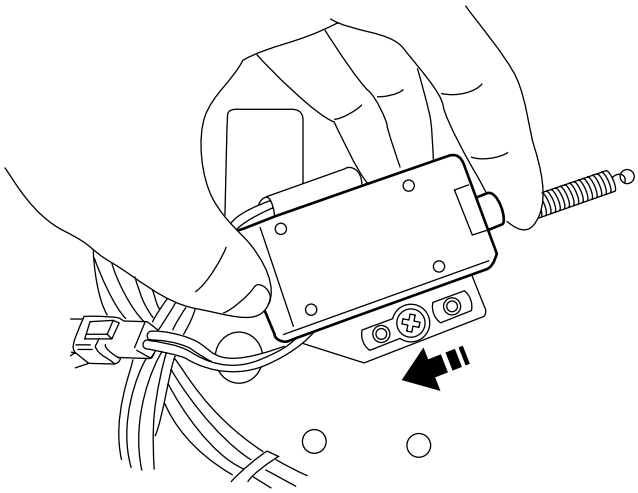




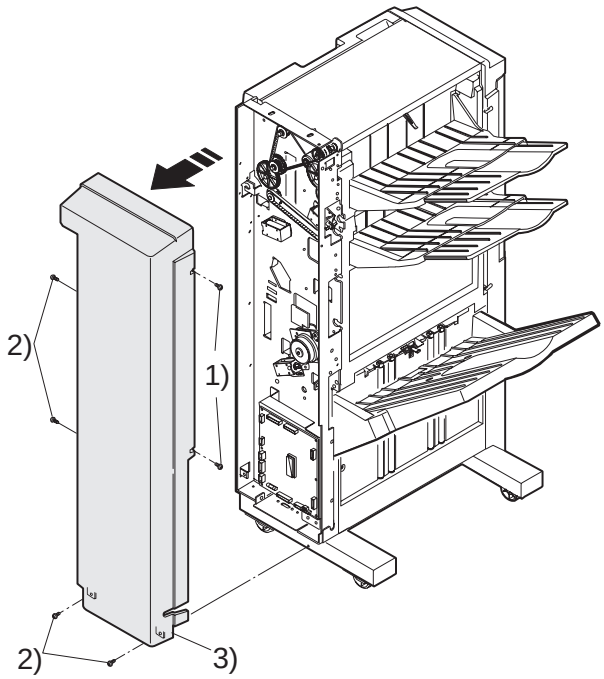
[Adjustment and precaution in setting]

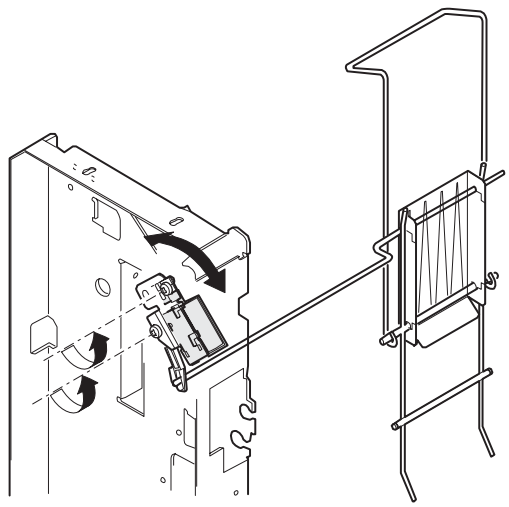
Paper discharge gate (OG3SL) adjustment procedures

Manually pull the plunger in the arrow direction until it stops, and fix it at that position.



5. Paper holding solenoid

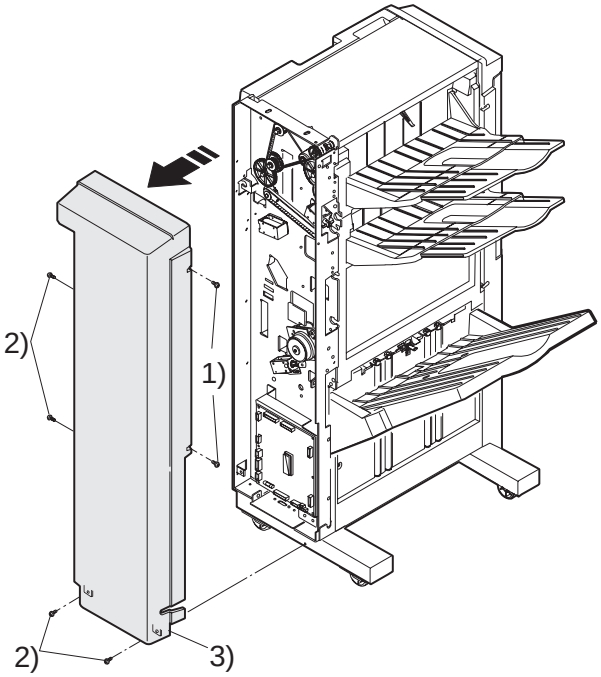


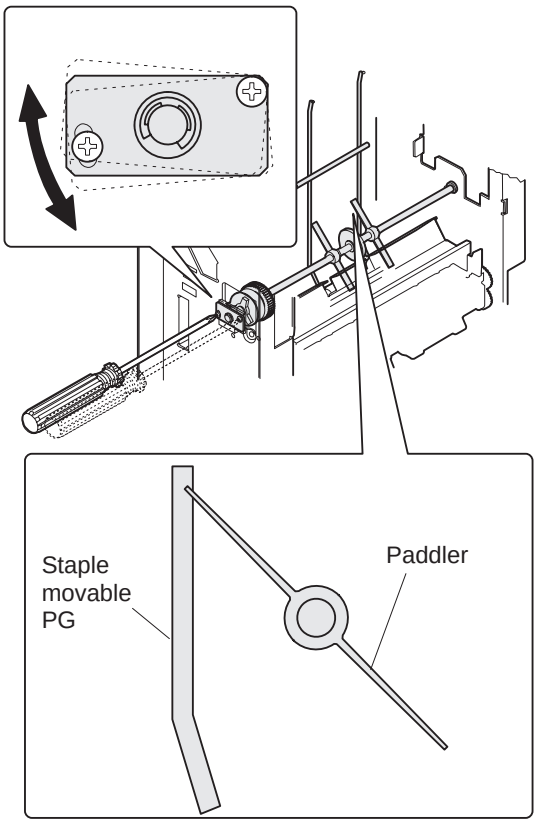


[Adjustment and note for setting]

Fix it at the center of the long hole.

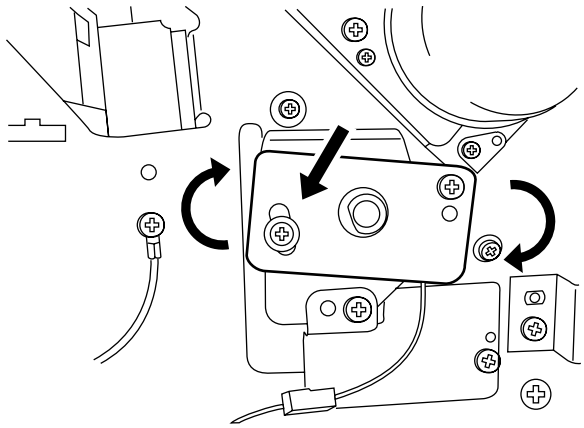
6. Paddler clutch

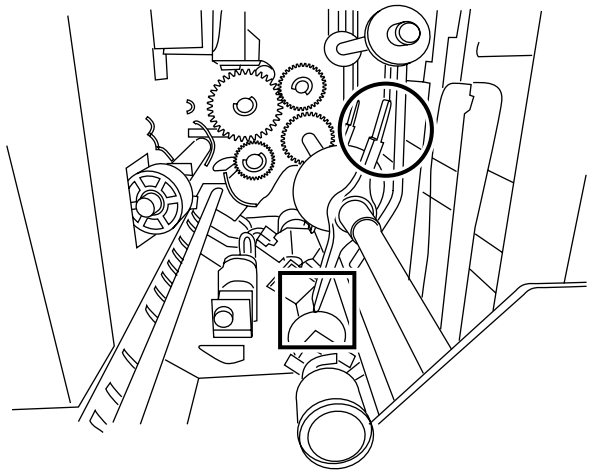




[Adjustment and note for setting]

Loosen the fixing screw (indicated with an arrow in the figure) of the paddler adjustment plate, and turn the paddler adjustment plate in the arrow direction and fix it.





7. Vertical transport de-curler

[Process]

Use the vertical transport de-curler adjustment jig to adjust the nip quantity.

1) Insert the marked section of the jig corresponding to each nip quantity under the unit as shown below.
2) Insert the vertical transport de-curler adjustment jig until it makes contact with the shaft.
3) Adjust with the set screw, and tighten the screw (S tight M3).

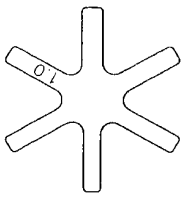
Perform the same procedures for F and R.

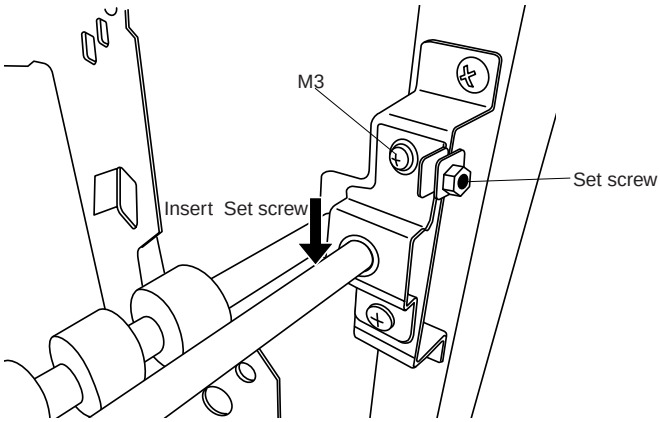
Check that the transport de-curler adjustment jig is smoothly inserted on either side of F/R.

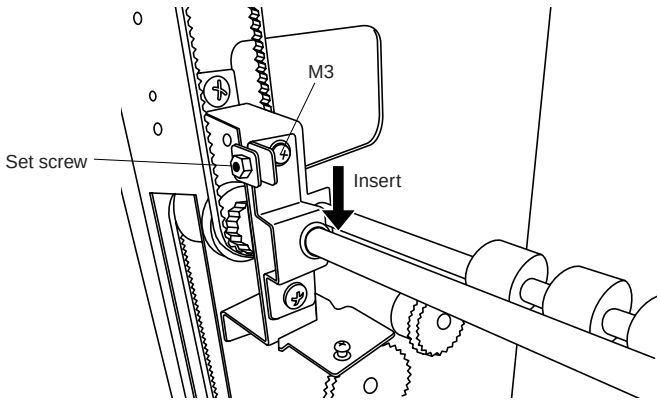
If the jig cannot be inserted smoothly, perform the adjustment and check again.

Nip quantity (reference) dimension between shafts	1.0 (5.0)
Inch series	❍
EX AB series	❍
Japan	❍

Transport de-curler adjustment jig







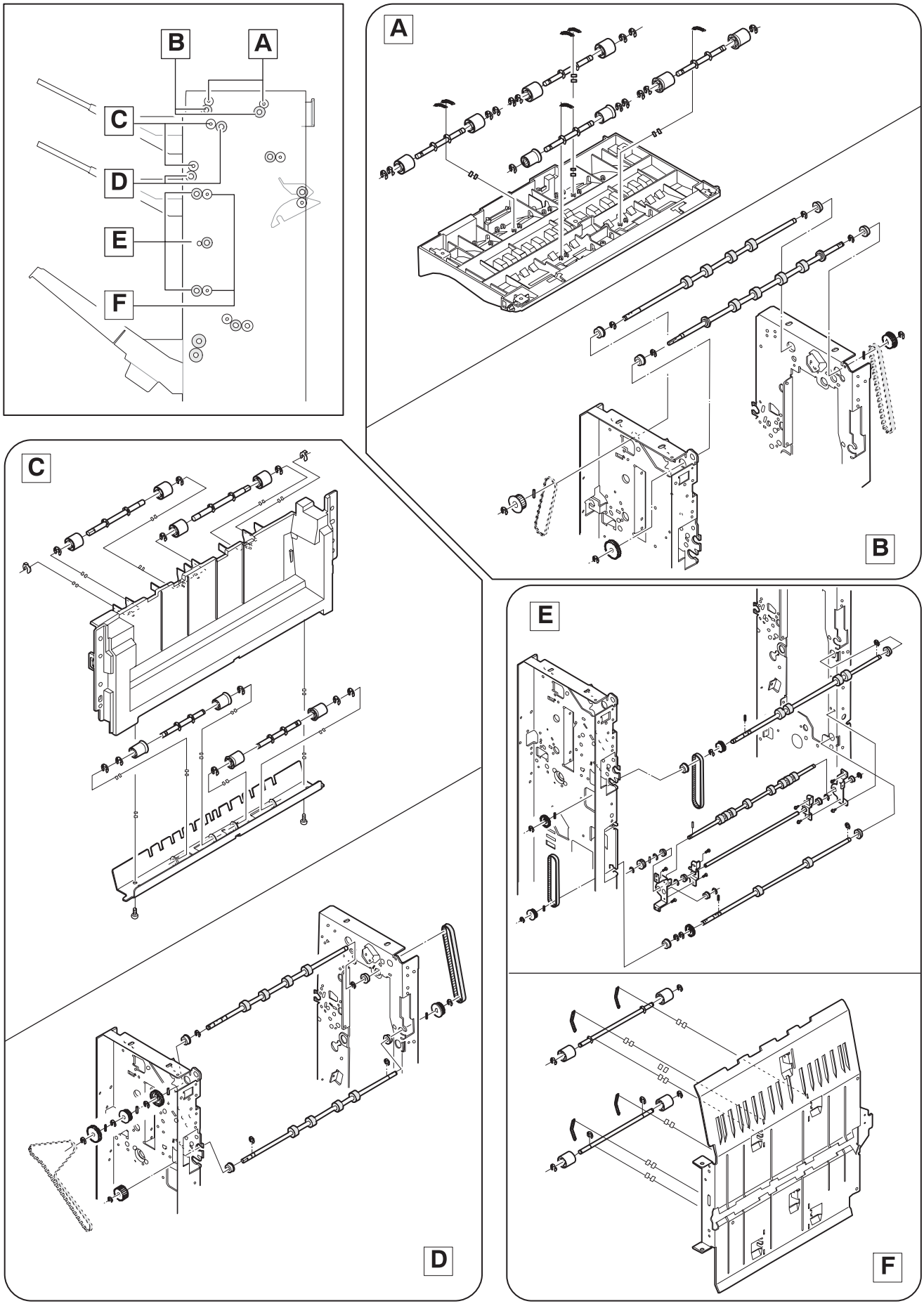
[7] MAINTENANCE

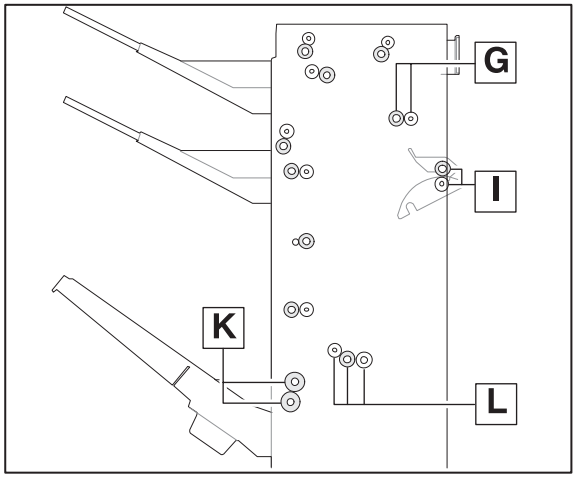
If reception is performed during maintenance work, it is very dangerous. Therefore, be sure to disconnect the power cable from the machine.

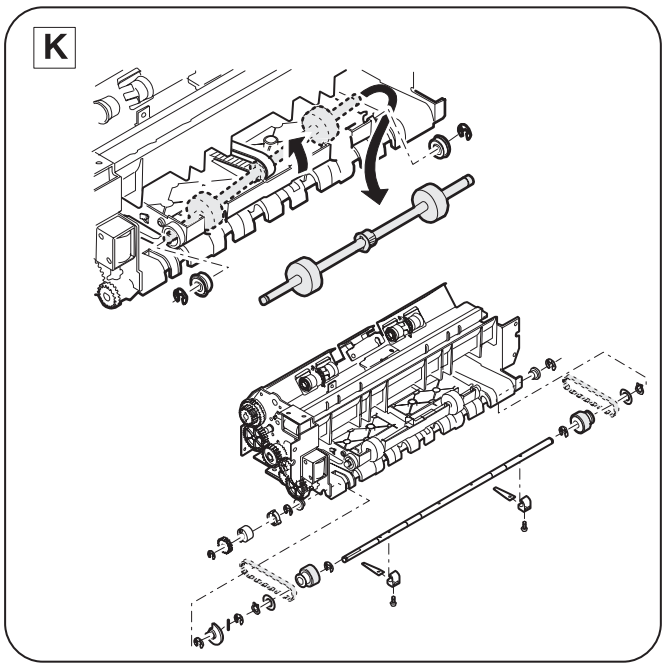
1. Maintenance system table

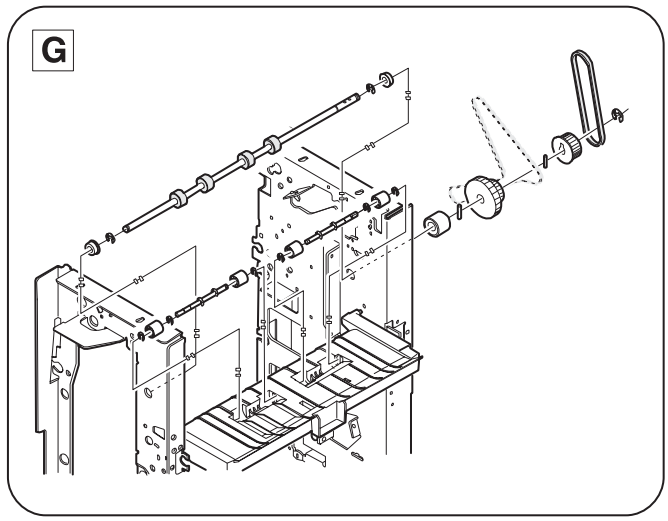
Name	Work	Execution conditions		Note
		Execution timing	Cycle	
Rollers	Clean	Maintenance service	80K or 2 years	
Paper guides	Clean	Maintenance service	80K or 2 years	
Gears	Lubricate Grease	Maintenance service	80K or 2 years	
Belts	Check	Maintenance service	120K or 2 years	
Sensors	Check	Maintenance service	80K or 2 years	
Staple unit	Replace	Maintenance service	100K	

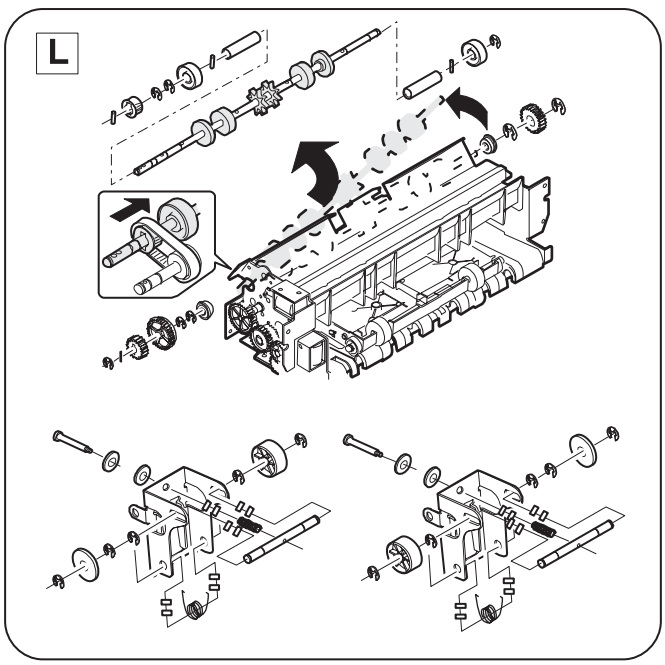
(Rollers/Paper guides)

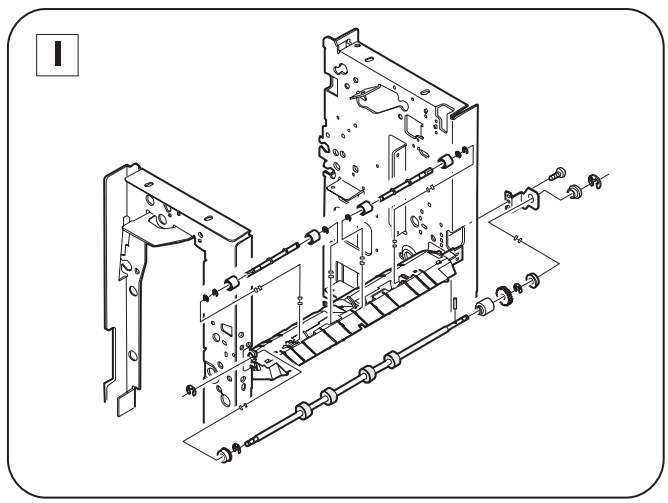



G
I
K
L

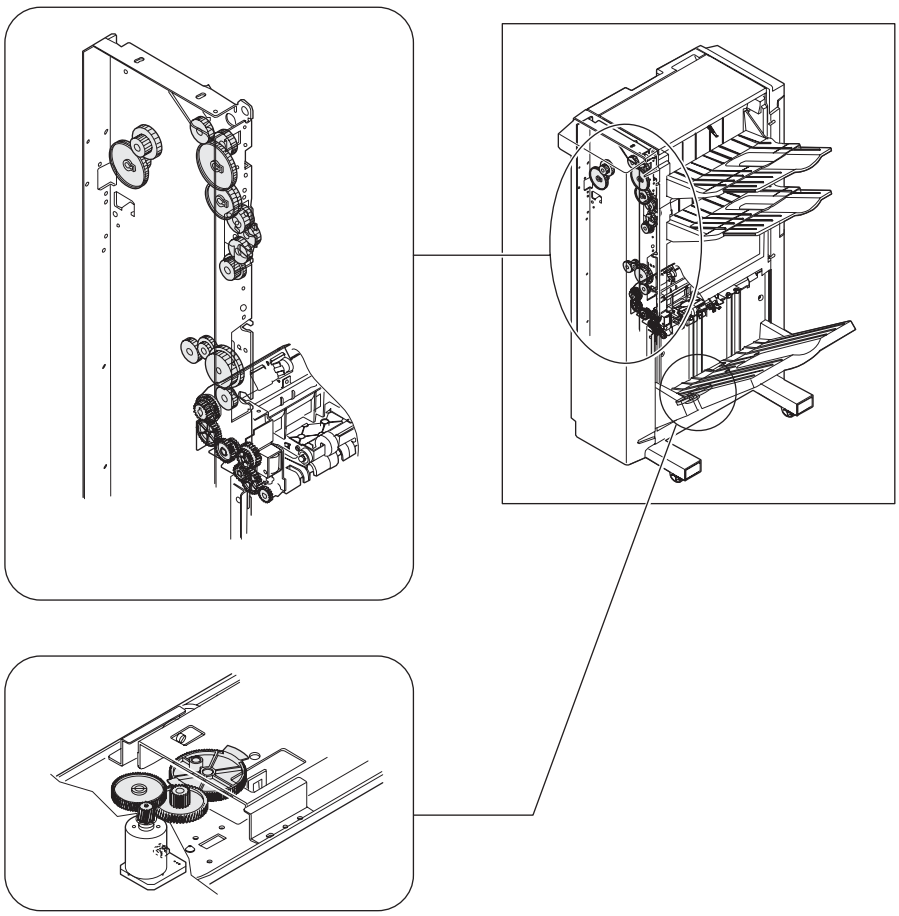

K


G

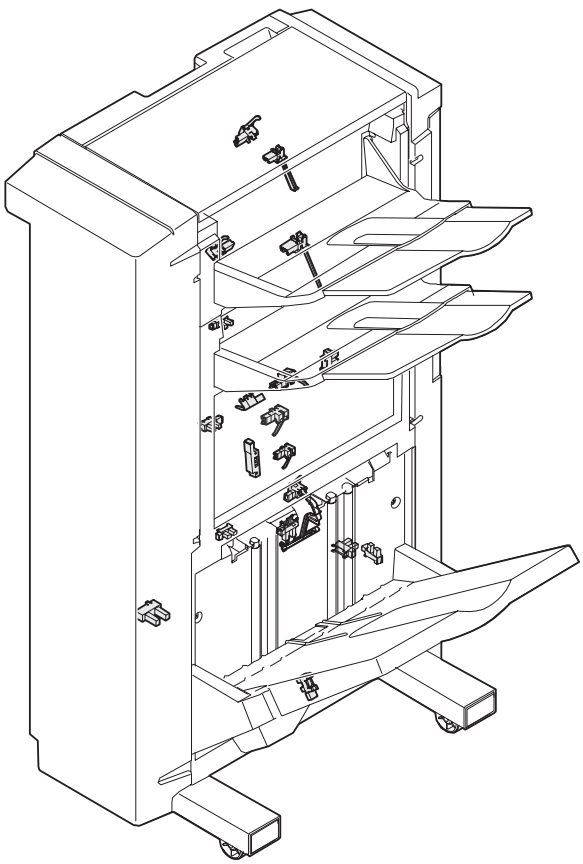

L


I

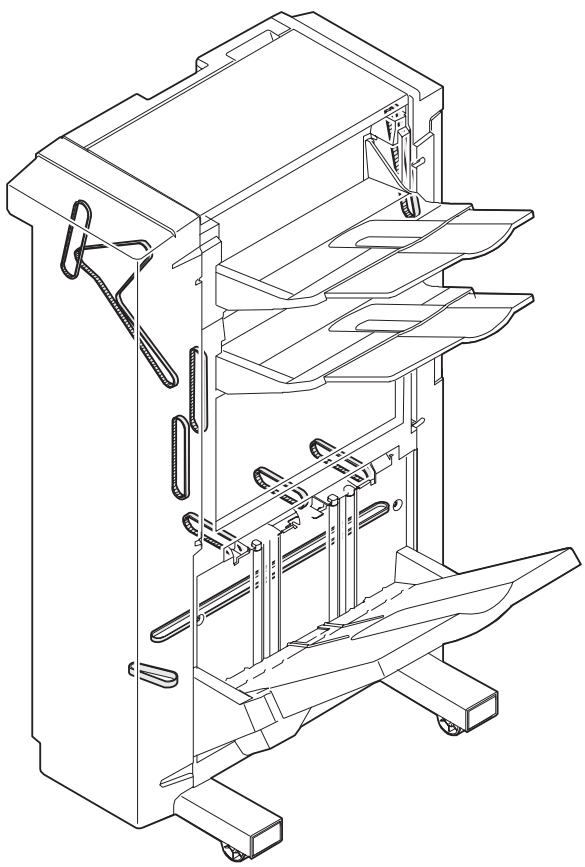
(Gears)



Others (Sensors)



(Belts)



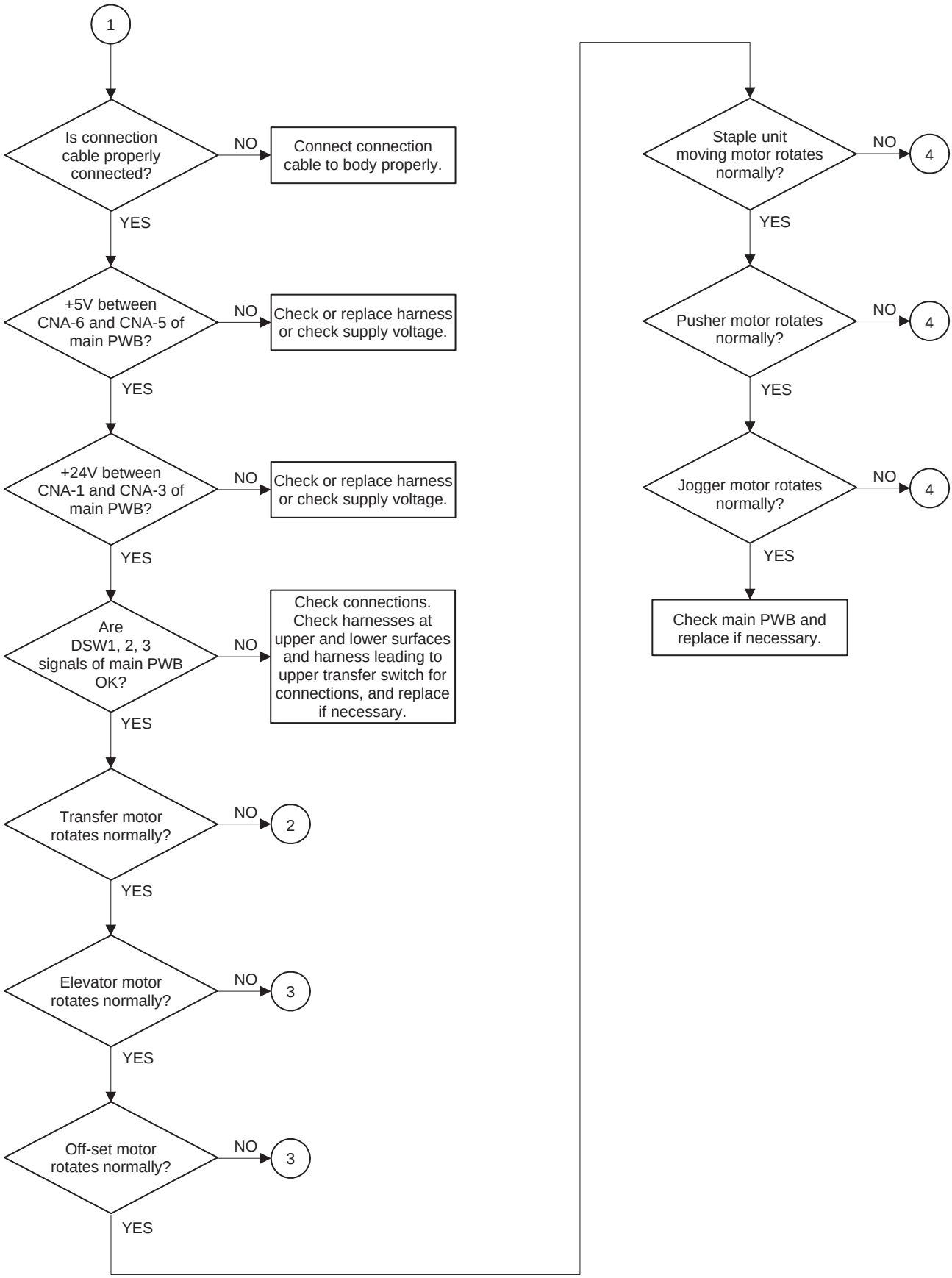
[8] TROUBLESHOOTING

1. Trouble code

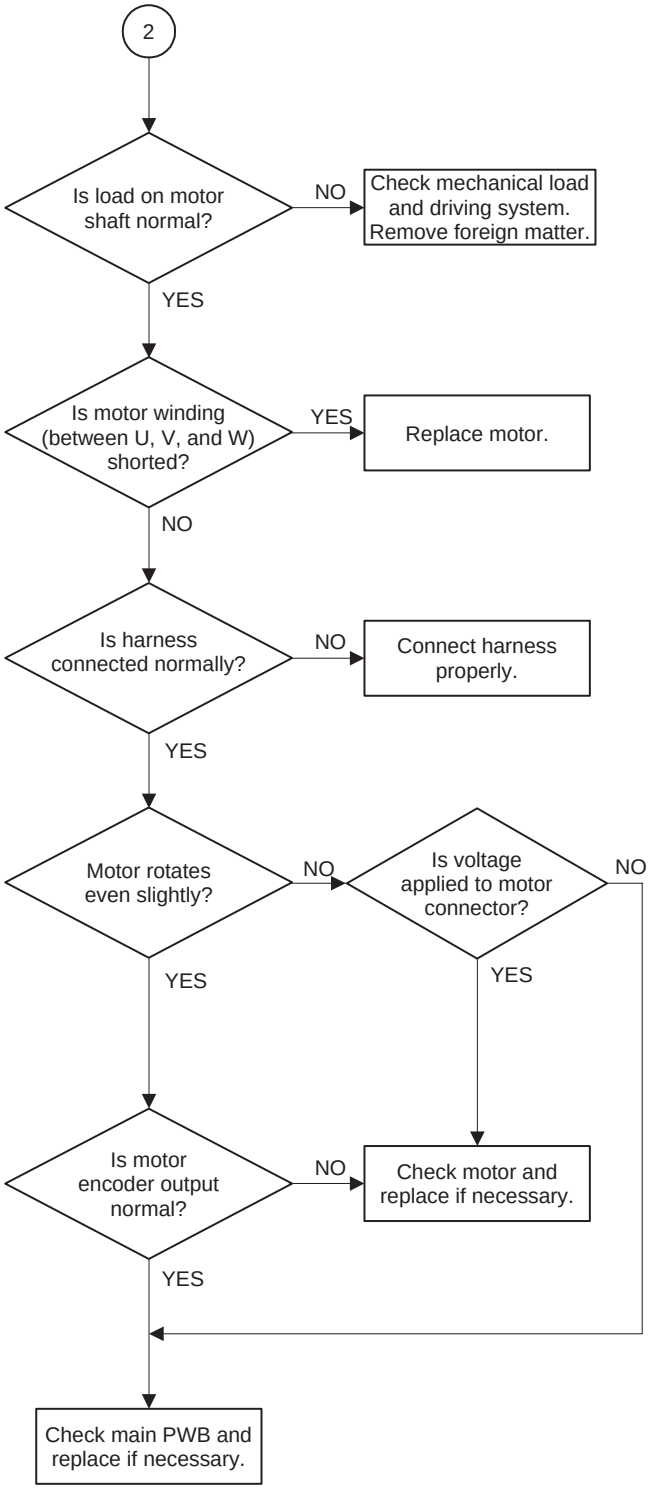
Trouble code		Description	
Main code	Sub code		
F1	00	Content	Finisher communication trouble
		Detail	Communication line test error occurs when power is turned on or after the exit of a simulation mode. Improper communication with sorter
		Cause	Improper connection or broken wire of connector or harness between copier and Finisher Finisher control PWB defective Control PWB (PCU) defective Malfunction due to noise
		Check and remedy	Clear by turning the power supply OFF/ON. Check communication line connector and harness. Replace Finisher control PWB or PCU PWB.
	01	Content	Finisher jogger shift trouble
		Detail	Jogger shift trouble
		Cause	Motor lock Motor rpm abnormality Motor overcurrent Finisher control PWB trouble
		Check and remedy	Check the jogger motor operation with SIM 3-3.
	02	Content	Finisher transport motor error
		Detail	Transport motor drive trouble
		Cause	Motor lock
		Check and remedy	Check transport motor operation with SIM3-3.
	04	Content	Finisher indexer lower limit detected
		Detail	Indexer has exceeded lower limit.
		Cause	Sensor defective Finisher control PWB defective
		Check and remedy	Check sensor with SIM3-2.
	05	Content	Finisher elevator motor trouble
		Detail	Indexer has exceeded upper limit
		Cause	Sensor defective Finisher control PWB defective
		Check and remedy	Check sensor with SIM3-2.
	06	Content	Finisher shift motor error
		Detail	Finisher shift motor trouble
		Cause	Motor lock Improper motor speed Overcurrent to motor Finisher control PWB defective
		Check and remedy	Check shift motor operation with SIM3-3.
F1	08	Content	Finisher staple shift motor trouble
		Detail	Staple motor drive trouble
		Cause	Motor lock Motor RPM abnormality Motor overcurrent Finisher control PWB trouble
		Check and remedy	Check the staple motor operation with SIM 3-3.

Trouble code		Description	
Main code	Sub code		
F1	10	Content	Staple unit operation trouble
		Detail	Staple operation trouble
		Cause	Motor lock Motor rpm abnormality Motor overcurrent Finisher control PWB trouble
		Check and remedy	Check the staple motor operation with SIM 3-3.
	11	Content	Pusher motor trouble
		Detail	Pusher motor trouble
		Cause	Motor lock Motor rpm abnormality Motor overcurrent Finisher control PWB trouble
		Check and remedy	Check the pusher motor operation with SIM 3-3.
	15	Content	Finisher elevator motor trouble
		Detail	Elevator motor trouble
		Cause	Motor lock Motor rpm abnormality Motor overcurrent Finisher control PWB trouble
		Check and remedy	Check the elevator motor operation with SIM 3-3.
	17	Content	ST paper exit roller pressure release trouble
		Detail	ST paper exit roller pressure release trouble when turning on the power/initializing
		Cause	ST paper exit roller pressure release clutch abnormality ST paper exit roller pressure release clutch HP sensor abnormality
		Check and remedy	Stop the transport motor in SIM 3-3, turn on the STORCL to check that the pressure release roller operates. Check the STORHP sensor with SIM 3-2.
	18	Content	Tray 3 paper exit paddler operation trouble
		Detail	Tray 3 paper exit paddler operation trouble when turning on the power/initializing
		Cause	Tray 3 paper exit paddler solenoid abnormality Tray 3 paper exit paddler HP sensor abnormality Finisher control PWB trouble
		Check and remedy	Operate the transport motor with SIM 3-3 and turn on T3PDSL to check that tray 3 paddler operates. Check T3PDHP sensor with SIM 3-2.
	80	Content	Finisher power trouble
		Detail	24V power is not supplied to the finisher PWB.
		Cause	Connector harness improper connection or disconnection Finisher control PWB trouble Power unit trouble
		Check and remedy	Check the sensor operation with SIM 3-2.

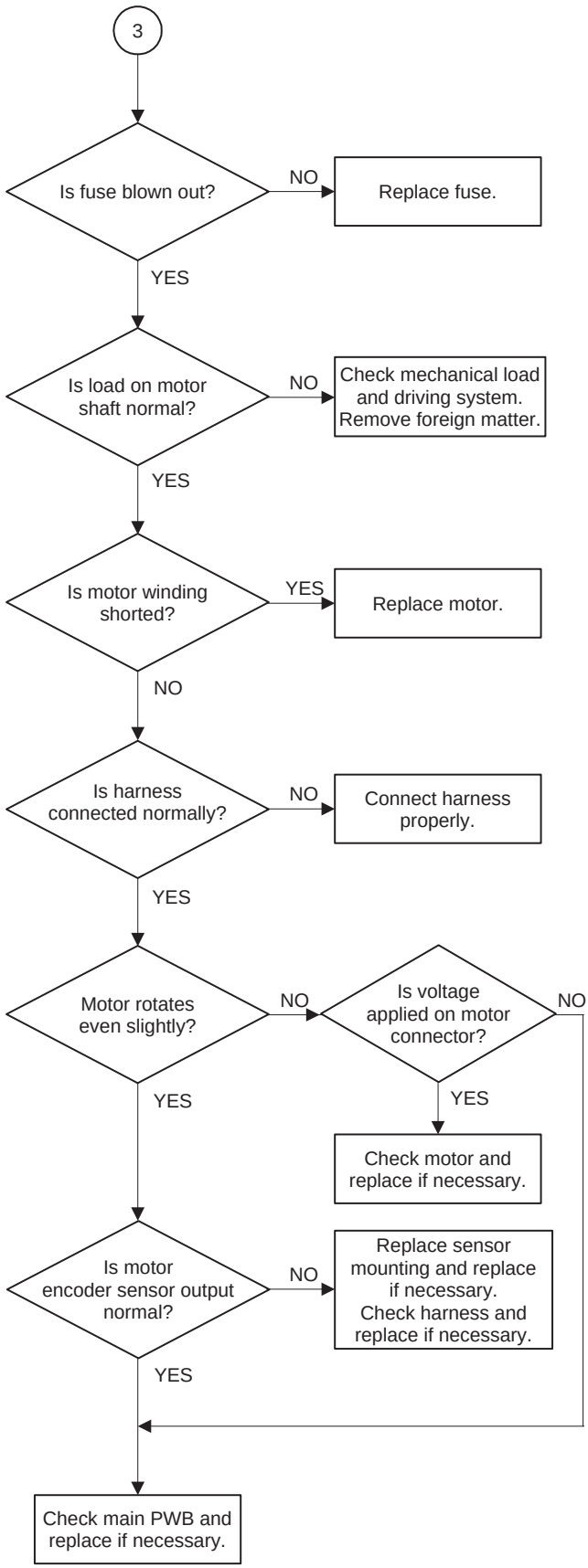
(1) Finisher does not operate. (excluding JAM state)



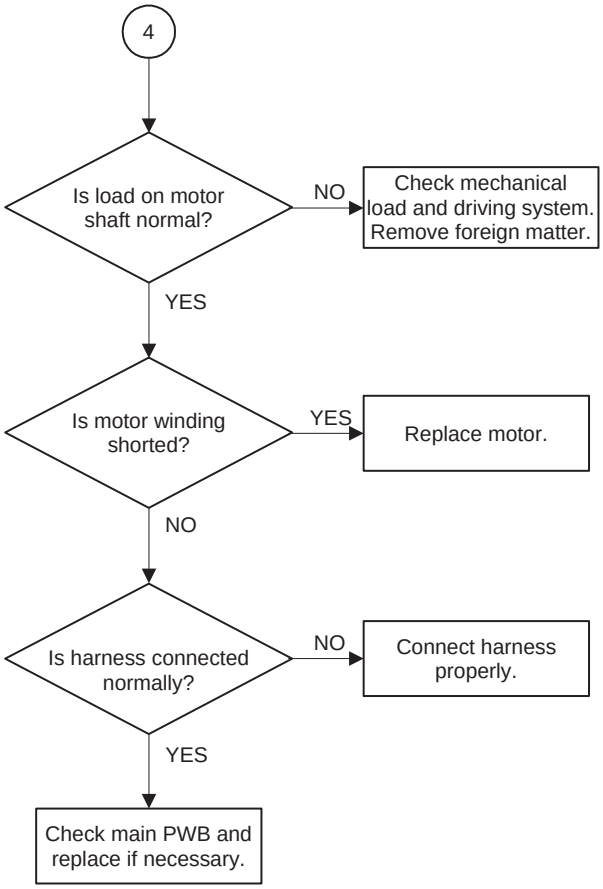
(2) Transport motor error



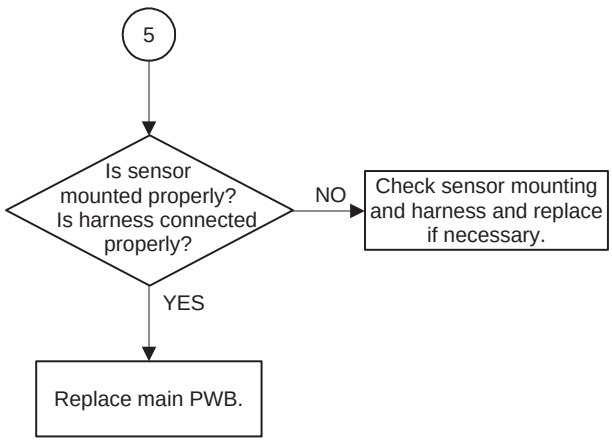
(3) Elevator and off-set motor error



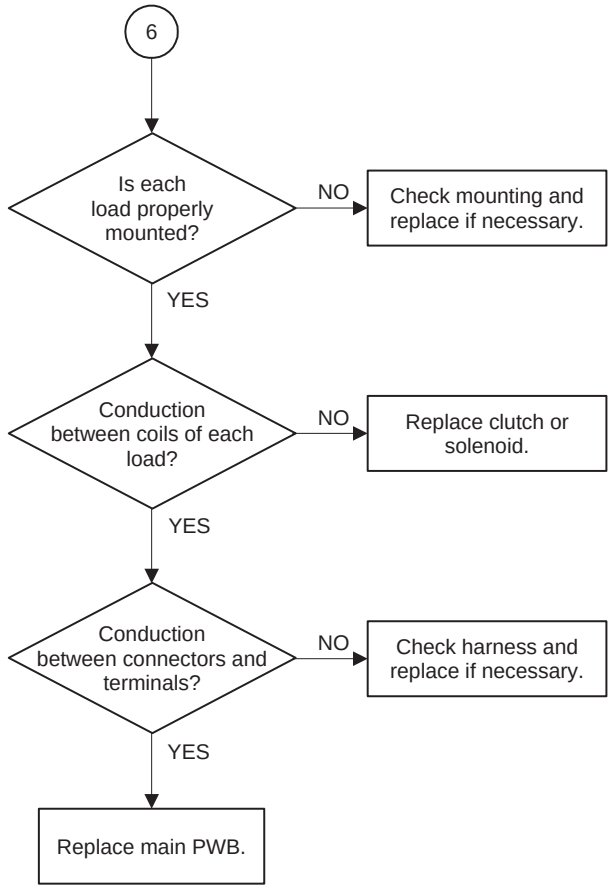
(4) Stepping motor error



(5) Sensor error



(6) Clutch and solenoid error



[9] CIRCUIT DESCRIPTIONS

1. Outline

The finisher main circuit transmits and receives data to and from the copier main PWB. According to instructions from the copier, it controls loads, sensors and the input of switching information.
The finisher main circuit consists of a circuit which receives signals from sensors and switches, a circuit which drives solenoids and clutches, CPU, ROM, expansion I/O and other peripheral circuits.

2. Block diagram

The finisher block diagram is shown in Fig. 1.

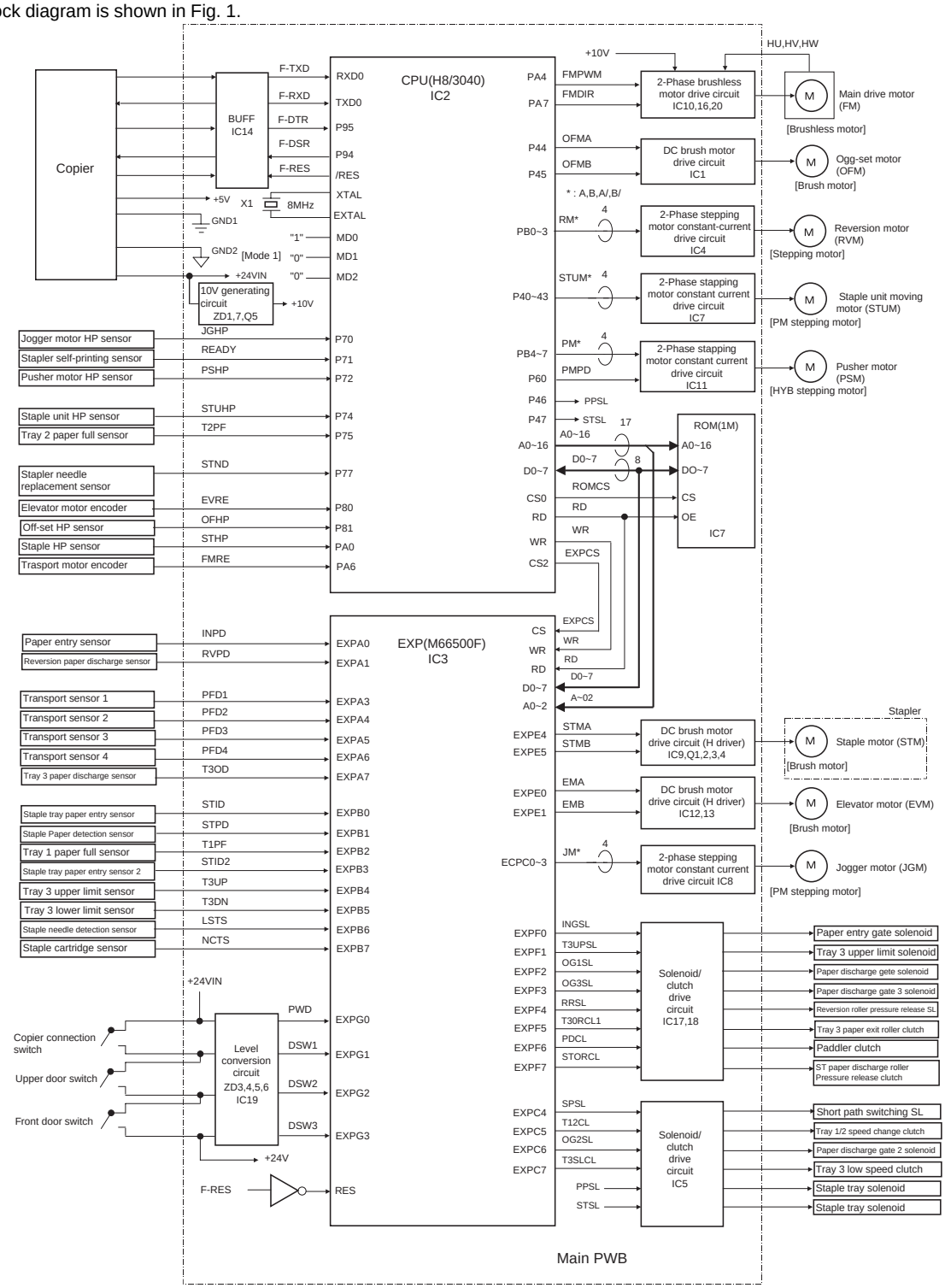


Fig. 1 3 tray finisher block diagram

3. CPU (HB/3040)

A. Outline

The CPU (IC3) controls finisher loads and the system synchronously, transmitting and receiving data to and from the copier main PWB through the serial communication line.

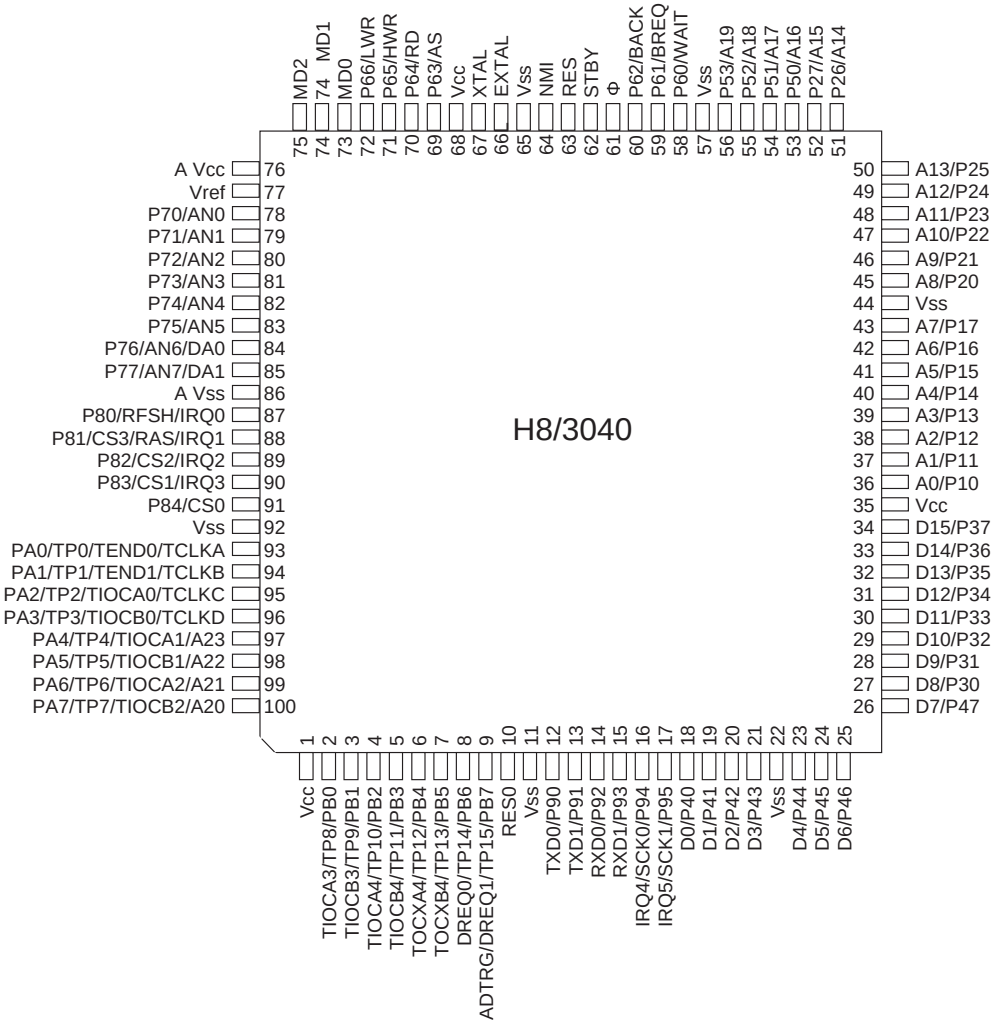
B. Features

The H8/3040 is a high-performance single chip microprocessor using the 32-bit H8/300H CPU as a core, integrating peripheral functions necessary for system configuration.

The H8/300H CPU has an internal 32-bit configuration and is equipped with 16-bit × 16 general-purpose registers and a simple, optimized instruction set for high-speed operation. It can handle 16M byte linear address space.

As peripheral functions, it contains ROM, RAM, 16-bit integrated timer unit (ITU), programmable timing patter controller (TPC), watchdog timer (WDT), serial communication interface (SCI), A/D converter, D/A converter, I/O port, DMA controller (DMAC), and refresh controller.

C. Terminal connection diagram



D. CPU: H8/3040 (IC3) terminal signals

Pin No.	Port	Signal name	IN/OUT	ACTIVE	Specification	Remarks
1	VCC	VCC			Power supply (+5V)	
2	PB0	T3OMA	OUT	H	Tray 3 paper discharge motor drive signal A	
3	PB1	T3OMA/	OUT	H	Tray 3 paper discharge motor drive signal A/	
4	PB2	T3OMB	OUT	H	Tray 3 paper discharge motor drive signal B	
5	PB3	T3OMB/	OUT	H	Tray 3 paper discharge motor drive signal B/	
6	PB4	PMA	OUT	H	Pusher motor drive signal A	
7	PB5	PMA/	OUT	H	Pusher motor drive signal A/	
8	PB6	PMB	OUT	H	Pusher motor drive signal B	
9	PB7	PMB/	OUT	H	Pusher motor drive signal B/	
10	/RES0	RES0/	OUT	L	External device reset signal	
11	VSS	GND			Power supply (GND)	
12	P90	F-RXD	OUT		UART output	
13	P91	N.C				
14	P92	F-TXD	IN		UART input	
15	P93	N.C				
16	P94	F-DSR	OUT	H	DSR signal output to copier (communication request at H)	
17	P95	F-DTR	IN	H	DTR signal input from copier (communication permission at H)	
18	P40	STUMA	OUT	H	Staple unit movement motor drive signal A	
19	P41	STUMA/	OUT	H	Staple unit movement motor drive signal A/	
20	P42	STUMB	OUT	H	Staple unit movement motor drive signal B	
21	P43	STUMB/	OUT	H	Staple unit movement motor drive signal B/	
22	VSS	GND			Power supply (GND)	
23	P44	OFMA	OUT	H	Off-set motor CCW drive signal	
24	P45	OFMB	OUT	H	Off-set motor CW drive signal	
25	P46	N.C				
26	P47	N.C				
27	P30	D0	IN/OUT		Data signal (D0)	
28	P31	D1	IN/OUT		Data signal (D1)	
29	P32	D2	IN/OUT		Data signal (D2)	
30	P33	D3	IN/OUT		Data signal (D3)	
31	P34	D4	IN/OUT		Data signal (D4)	
32	P35	D5	IN/OUT		Data signal (D5)	
33	P36	D6	IN/OUT		Data signal (D6)	
34	P37	D7	IN/OUT		Data signal (D7)	
35	VCC	VCC			Power supply (+5V)	
36	P10	A0	OUT		Address signal (A0)	
37	P11	A1	OUT		Address signal (A1)	
38	P12	A2	OUT		Address signal (A2)	
39	P13	A3	OUT		Address signal (A3)	
40	P14	A4	OUT		Address signal (A4)	
41	P15	A5	OUT		Address signal (A5)	
42	P16	A6	OUT		Address signal (A6)	
43	P17	A7	OUT		Address signal (A7)	
44	VSS	GND			Power supply (GND)	
45	P20	A8	OUT		Address signal (A8)	
46	P21	A9	OUT		Address signal (A9)	
47	P22	A10	OUT		Address signal (A10)	
48	P23	A11	OUT		Address signal (A11)	
49	P24	A12	OUT		Address signal (A12)	
50	P25	A13	OUT		Address signal (A13)	
51	P26	A14	OUT		Address signal (A14)	
52	P27	A15	OUT		Address signal (A15)	
53	P50	A16	OUT		Address signal (A16)	
54	P51	A17	OUT		Address signal (A17)	
55	P52	A18	OUT		Address signal (A18)	
56	P53	A19	OUT		Address signal (A19)	
57	VSS	GND			Power supply (GND)	
58	P60	PMPD	OUT	H	Pusher motor power down signal (power down at H)	
59	P61	JMPD	OUT	H	Jogger motor power down signal (H: Power down)	
60	P62	T3MPD	OUT	H	Tray 3 paper discharge motor power down signal (H: Power down)	
61	S-CLK	S-CLK	OUT		System lock signal	
62	/STBY	STBY/	IN	L	Stand-by signal (fixed at H level)	
63	/RES	RES/	IN	L	Reset signal (reset at L)	
64	NMI	NMI	IN	H	Non-maskable interruption (fixed at L level)	
65	VSS	GND			Power supply (GND)	
66	EXTAL	EXTAL	IN		Clock (12.2MHz)	
67	XTAL	XTAL	IN		Clock (12.2MHz)	
68	VCC	VCC			Power supply (+5V)	

Pin No.	Port	Signal name	IN/OUT	ACTIVE	Specification	Remarks
69	P63	AS/	OUT	H	Address strobe signal	
70	P64	RD/	OUT	L	ROM, I/O read signal (read at L)	
71	P65	HWR/	OUT	L	Upper write signal (write at L)	
72	P66	LWR/	OUT	L	Lower write signal (write at L)	
73	MD0	MD0	IN		Mode setting signal 0 (fixed at H level)	
74	MD1	MD1	IN		Mode setting signal 1 (fixed at L level)	
75	MD2	MD2	IN		Mode setting signal 2 (fixed at L level)	
76	AVCC	AVCC			A/D, D/A converter power supply	
77	VREF	VREF			A/D, D/A converter reference voltage	
78	P70	JGHP	IN	H	Jogger motor home position signal (home position at H)	
79	P71	READY/	IN	L	Stapler self-priming signal (ready at L)	
80	P72	PSHP	IN	H	Pusher motor home position signal (home position at H)	
81	P73	STORHP/	IN	L		
82	P74	STUHP	IN	H	Stapler unit home position signal (home position at H)	
83	P75	T2PF/	IN	L	Tray 2 paper full sensor signal (full at L)	
84	P76	N.C			ST pressure release home position signal (L: Pressure applied)	
85	P77	STND	IN	L	Stapler needle replacement sensor (needle being replaced at L)	
86	AVSS	GND			Power supply (GND)	
87	P80	EVRE	IN		Elevator motor encoder	
88	P81	OFHP	IN	H	Off-set tray home position signal (home position at H)	
89	P82	EXPCS/	OUT	L	Expansion I/O chip select signal (select at L)	
90	P83	N.C				
91	P84	ROMCS/	OUT	L	ROM chip select signal (select at L)	
92	VSS	GND			Power supply (GND)	
93	PA0	STHP/	IN	L	Stapler home position signal (home position at L)	
94	PA1	N.C				
95	PA2	N.C				
96	PA3	N.C				
97	PA4	FMPWM/	OUT	L	Transport motor control signal (PWM output)	
98	PA5	N.C				
99	PA6	FMRE	IN	H	Transport motor encoder signal	
100	PA7	FMDIR	OUT	L	Transport motor direction control signal (CW at L)	

4. Expansion I/O (M66500FP)

A. Outline

The expansion I/O converts data from the CPU into load control signals and input signals from sensors and switches into data for the CPU.

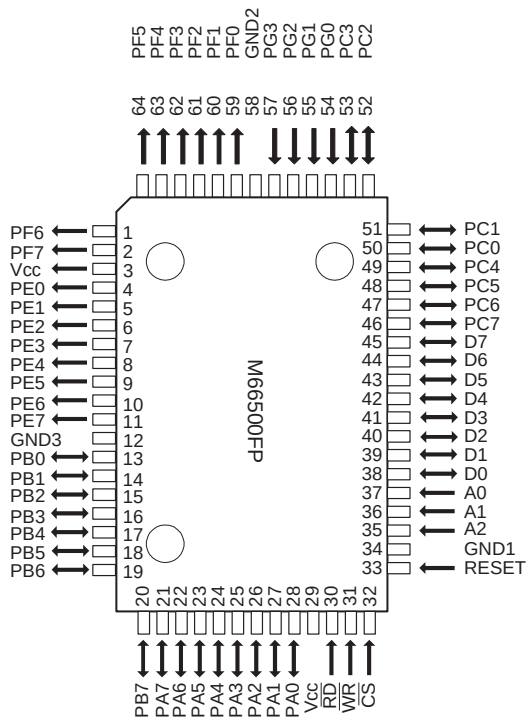
The expansion I/O uses the M66500FP.

B. Features

- I/Os are expandable up to 44 bits

  (8-bit I/O port × 3, 8-bit high-dielectric output port × 2, 4-bit input port × 1)
- Directly connectable to 12 MHz CPU without weight
- Writable to output port in input mode
- Output terminal status can be read from CPU
- Possible to drive transistor array
- 24 mA high-dielectric output port (16 bits) is incorporated.
- TTL level terminal at CPU side
- I/O terminal is CMOS level schmitt trigger input

C. Terminal connection diagram



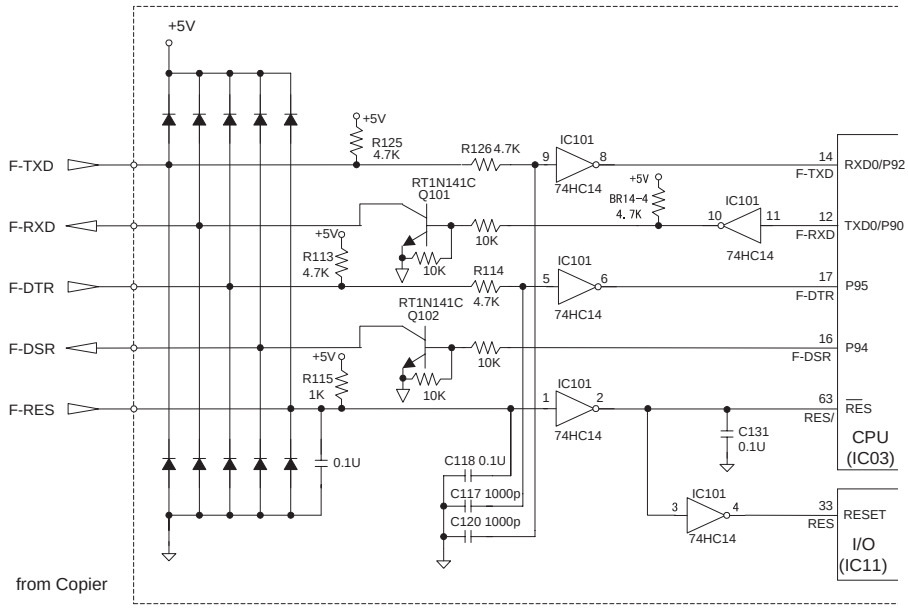
D. Expansion I/O: M66500FP (IC11) terminal signals

Pin No.	Port	Signal name	IN/OUT	ACTIVE	Specifications	Remarks
1	PF6	PDCL/	OUT	L	Paddler clutch drive signal (On at L)	
2	PF7	STORCL/	OUT	L	Paper discharge roller pressure release clutch (On at L)	
3	VCC	VCC			Power supply (+5V)	
4	PE0	EMA	OUT	H	Elevator motor CW drive signal	
5	PE1	EMB	OUT	H	Elevator motor CCW drive signal	
6	PE2	N.C				
7	PE3	N.C				
8	PE4	STMA	OUT	H	Staple motor CW drive signal	
9	PE5	STMB	OUT	H	Staple motor CCW drive signal	
10	PE6	N.C				
11	PE7	N.C				
12	GND	GND			Power supply (GND)	
13	PB0	STID/	IN	L	Staple tray paper entry sensor signal (On at L)	
14	PB1	STPD/	IN	L	Staple tray paper sensor signal (On at L)	
15	PB2	T1PF/	IN	L	Tray 1 paper full sensor signal (On at L)	
16	PB3	STID	IN	L	Staple tray paper entry sensor 2 signal (ON at L)	
17	PB4	T3UP	IN	H	Tray 3 upper limit sensor signal (On at H)	
18	PB5	T3DN	IN	H	Tray 3 lower limit sensor signal (On at H)	
19	PB6	LSTS/	IN	L	Stapler needle sensor signal (presence of needle at L)	
20	PB7	NCTS/	IN	L	Stapler cartridge sensor signal (presence of cartridge at L)	
21	PA7	T3OD/	IN	L	Tray 3 paper discharge sensor signal (On at L)	
22	PA6	PFD4/	IN	L	Transport sensor signal 4 (On at L)	
23	PA5	PFD3/	IN	L	Transport sensor signal 3 (On at L)	
24	PA4	PFD2/	IN	L	Transport sensor signal 2 (On at L)	
25	PA3	N.C				
26	PA2	N.C				
27	PA1	T3PDHP/	IN	L	Paper discharge paddler home position sensor signal (L: HP)	
28	PA0	INPD/	IN	L	Paper entry sensor signal (On at L)	
29	VCC	VCC			Power supply (+5V)	
30	/RD	RD/	IN	L	Data read signal (read at L)	
31	/WR	WR/	IN	L	Data write signal (write at L)	
32	/CS	CS/	IN	L	Chip select signal (select at L)	
33	RESET	RESET	IN	H	Reset signal (reset at H)	
34	GND	GND			Power supply (GND)	
35	A2	A2	IN		Address signal (A2)	
36	A1	A1	IN		Address signal (A1)	
37	A0	A0	IN		Address signal (A0)	
38	D0	D0	IN/OUT		Data signal (D0)	
39	D1	D1	IN/OUT		Data signal (D1)	
40	D2	D2	IN/OUT		Data signal (D2)	
41	D3	D3	IN/OUT		Data signal (D3)	
42	D4	D4	IN/OUT		Data signal (D4)	
43	D5	D5	IN/OUT		Data signal (D5)	
44	D6	D6	IN/OUT		Data signal (D6)	
45	D7	D7	IN/OUT		Data signal (D7)	
46	PC7	STPDSL	OUT	H	Paddler solenoid in staple tray (H: ON)	
47	PC6	OG2SL	OUT	H	Paper discharge gate 2 solenoid (On at H)	
48	PC5	T3PDSL	OUT	H	Paper exit paddler solenoid (H: ON)	
49	PC4	N.C				
50	PC0	JMA	OUT	H	Jogger motor drive signal A	
51	PC1	JMA/	OUT	H	Jogger motor drive signal /A	
52	PC2	JMB	OUT	H	Jogger motor drive signal B	
53	PC3	JMB/	OUT	H	Jogger motor drive signal /B	
54	PG0	PWD	IN	H	Power supply shut-off monitoring signal (power shut-off at H)	
55	PG1	DSW1	IN	H	Connection to copier detection signal (disconnection at H)	
56	PG2	DSW2	IN	H	Upper door opening and closing detection signal (door open at H)	
57	PG3	DSW3	IN	H	Front door opening and closing detection signal (door open at H)	
58	GND	GND			Power supply (GND)	
59	PF0	N.C				
60	PF1	N.C				
61	PF2	OG1SL/	OUT	L	Paper discharge gate 1 solenoid drive signal (On at L)	
62	PF3	OG3SL/	OUT	L	Paper discharge gate 3 solenoid drive signal (On at L)	
63	PF4	N.C				
64	PF5	T30RCL/	OUT	L	Tray 3 high speed clutch drive signal (On at L)	

5. Communication buffer and reset circuit

In the communication buffer circuit, the transmission signal (F-TXD) and communication permit signal (F-DTR) from the copier are received by the buffer IC 74HC14 (IC101), while the reception signal (F-RXD) and communication request signal (F-DSR) transmitted from the finisher to the copier are outputted from the transistor Q101 and Q102.

The reset signal from the copier is also received by the IC101 and inputted to the CPU's reset terminal (active at L). In addition, the reversion signal is inputted to the expansion I/O reset terminal (active at H). For each signal, a protective diode is inserted between +5V and GND.

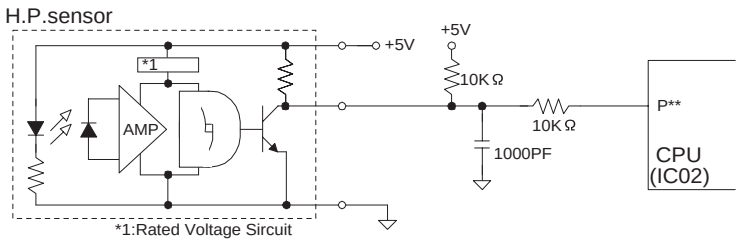


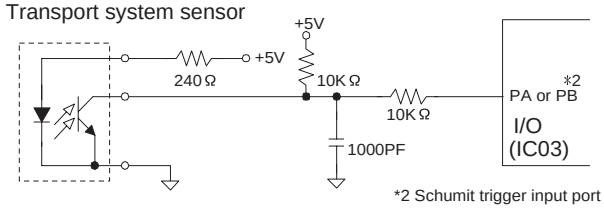
Signal name	Description	Logic (connector level)
F-TXD	Signal line from copier to finisher	Start bit detection at H Usual (marking state) at L
F-RXD	Signal line from finisher to copier	Start bit detection at L Usual (marking state) at L
F-DTR	Status display signal line for the signal showing communication permit from finisher to copier	Communication from finisher to copier is inhibited at H Communication from finisher to copier is permitted at L
F-DSR	Status display signal line for the signal showing communication request from finisher to copier	No communication request from finisher to copier at H Communication request from finisher to copier at L
F-RES	Hard rest signal from copier	Reset at H Reset is released at L

6. Sensor input circuit

The signal from each sensor connected to 10 kohm pull-up resistance and noise-removing 1000 pF capacitor, and connected through 10 kohm protective resistance to CPU, and expansion I/O Schmitt trigger input port.

The sensor signal for transport system is input to the schmitt trigger input port because the sensor input circuit is not provided with rectifier circuit.





7. Switch input circuit

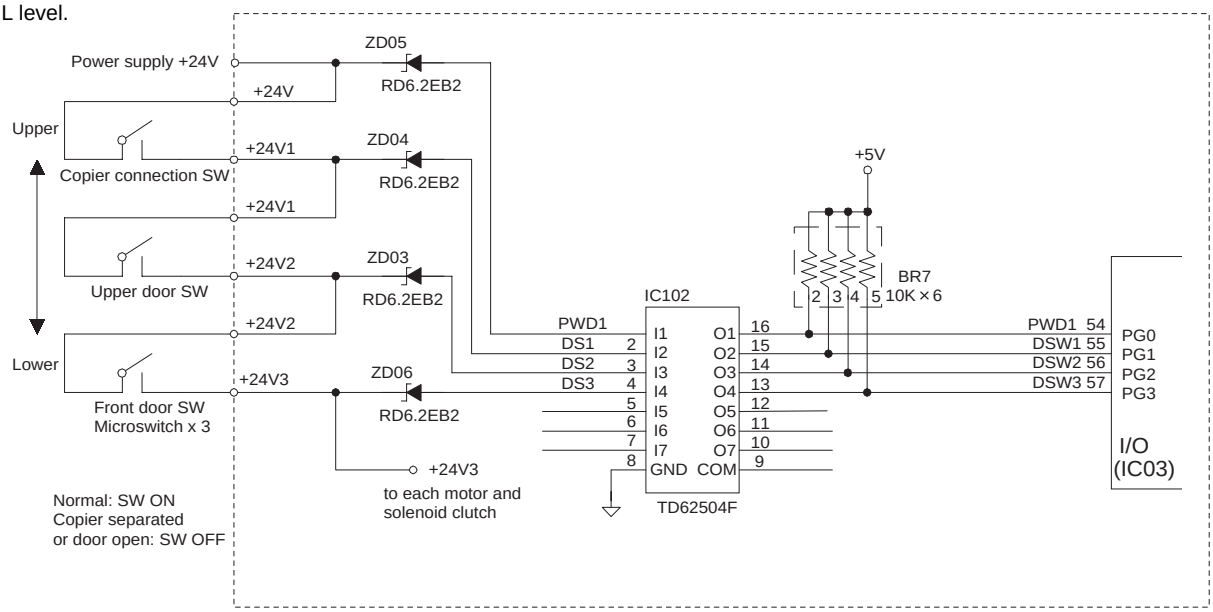
This circuit checks whether the finisher is connected to the copier, both the top and front doors are opened. It is connected to microswitches whose contacts are closed when the finisher is connected to the copier or the doors are closed.

Each switch is connected in series from +24V so that it becomes a power supply switch for the drive. That is, +24V is conducted only when all the 3 microswitches are closed.

When the finisher is connected to the copier, the microswitch turns on, letting +24V be applied to ZD4. This allows electric current to flow to the base resistance of the transistor array TD62504 (IC102), thus turning on the transistor to change the expansion I/O PG1 (DSW1 signal) to L level.

When the finisher is disconnected from the copier, the transistor is turned off to change the expansion I/O PG1 to H level. ZD4 (RD6.2E) has a threshold level preset, to increase detection speed when the supply of +24V is cut off. The levels of PG2 and 3 (DSW2, 3 signals) also change when the top and front door switch is opened and closed.

In addition, when +24V power supply from the copier is cut off, the expansion I/O PG0 (PWD signal) level changes at the above circuit.



Here are logic's at the time of the power supply from the copier being cut off and the doors opening and closing being detected.

Status	Expansion I/O port	PG0	PG1	PG2	PG3	Remarks
	Signal name	PWD	DSW1	DSW2	DSW3	
Power supply from copier is cut off		H	d.c	d.c	d.c	
Disconnected from copier		L	H	d.c	d.c	
Upper door open		L	L	H	d.c	
Front door open		L	L	L	H	

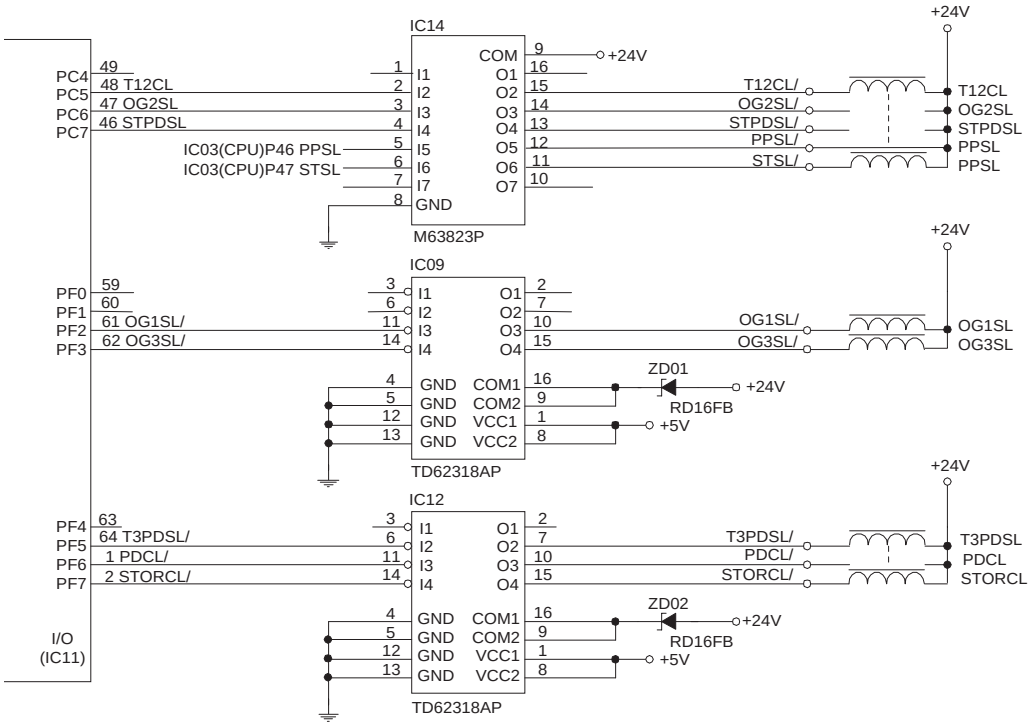
←Upper Lower→

H: Power supply cut off (door open)
L: Conducting (door closed)
d.c: Unknown (no status is shown because power is cut off at upstream)

8. Solenoid and clutch drive circuit

The solenoid and clutch drive circuit uses non-inversion transistor arrays TD62318AP (IC09, 12) which turn on the solenoids and clutches when the input signal is at L; and an inversion transistor array M63823P (IC14) which turns on the solenoids and clutches when the input signal is at H.

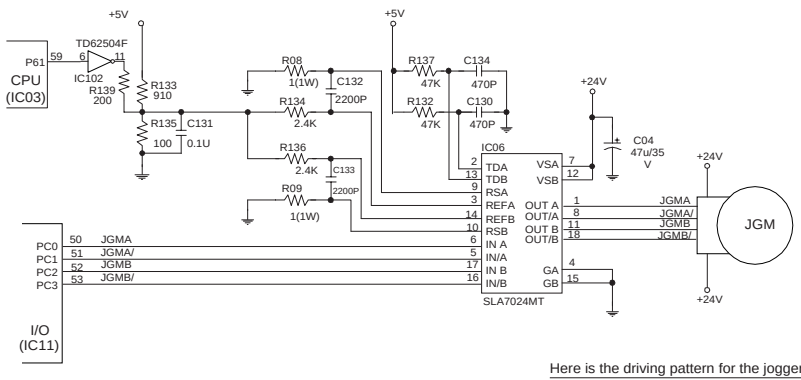
The expansion I/O PG port which controls the solenoids and clutches is an open collector type which becomes high impedance when resetting and H output. For this reason, to turn on the solenoids and clutches at L level, the non-inversion type TD62318AP is used for driving the PG port. On the other hand, the expansion I/O's PC port is at L level at resetting. For this reason, for driving the PC port, the inversion type M63823P which turns on the solenoids and clutches at H level is used.



9. Jogger motor drive circuit

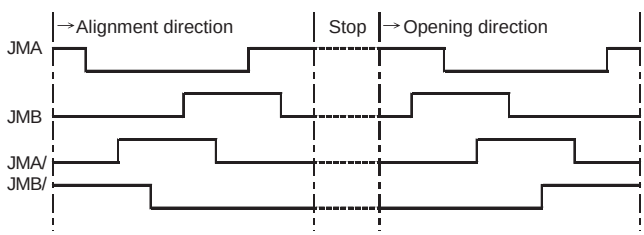
The jogger motor control signal (JMA, A/, B. B/) from the expansion I/O (IC11) is input into the driver IC SLA7024MT, to drive the jogger stepping motor which aligns the sheets sideways.

The driving method is unipolar, 1-2 phase excitement, constant-voltage method.



Here is the driving pattern for the jogger motor.

Here is the driving pattern for the jogger motor.

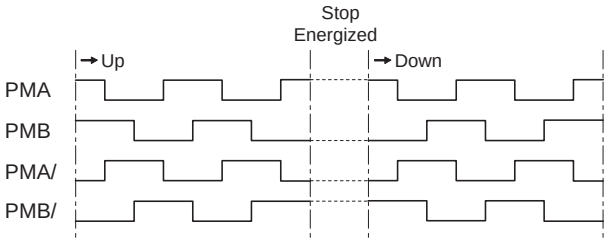


10. Pusher, reversion, staple unit moving motor drive circuit

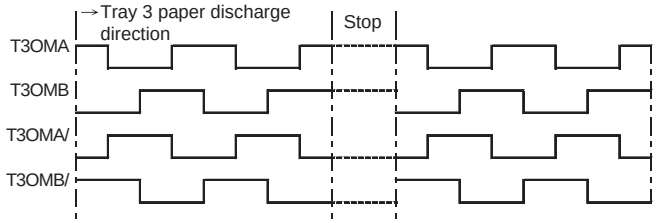
The pusher motor control signal (PMA, A/, B, B/), reversion motor control signal (RMA, A/, B, B/) and staple unit movement motor control signal (STUMA, A/, B, B/) from the CPU (IC3) are inputted to the stepping motor driver IC SLA7024M (IC4, 8, 10), to drive the following motors: the pusher motor which elevates the paper inside the staple tray to the stapling position and paper discharge position; the reversion motor which reverses the paper; and the staple unit moving motor which moves the staple unit to the stapling position.

The driving method is a unipolar, 2-phase (pusher and tray 3 paper discharge motor), 1-2 phase (staple unit motor), constant-current chopper driving method.

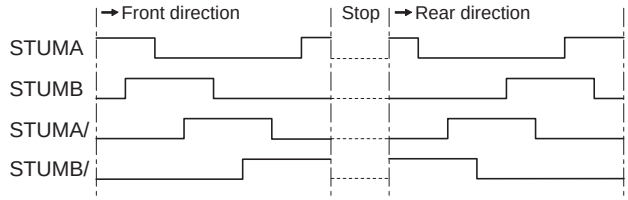
- Push motor drive pattern

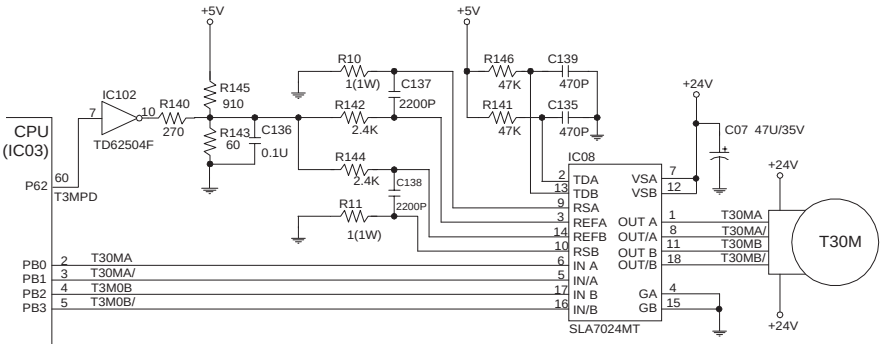


- Tray 3 paper discharge motor drive pattern

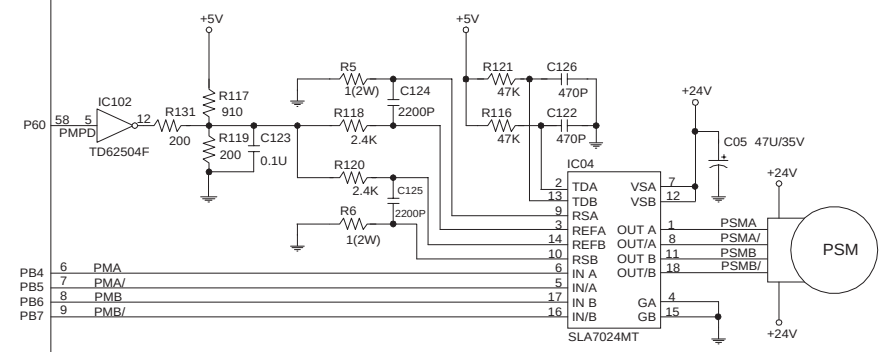


- Staple unit moving motor drive pattern

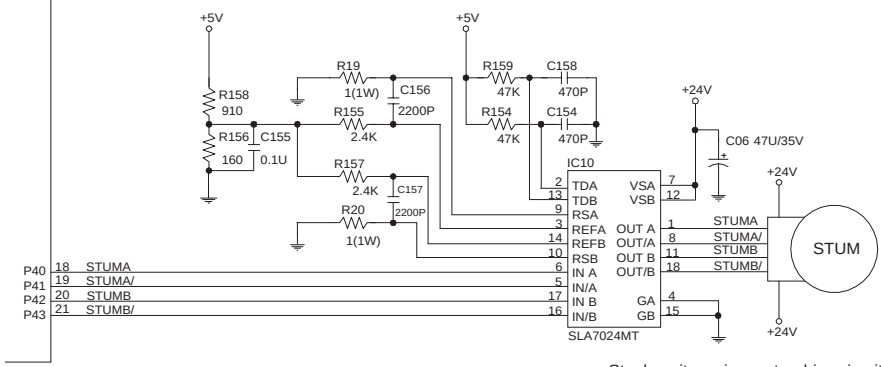




Tray 3 paper discharge motor drive circuit



Pusher motor drive circuit



Staple unit moving motor drive circuit

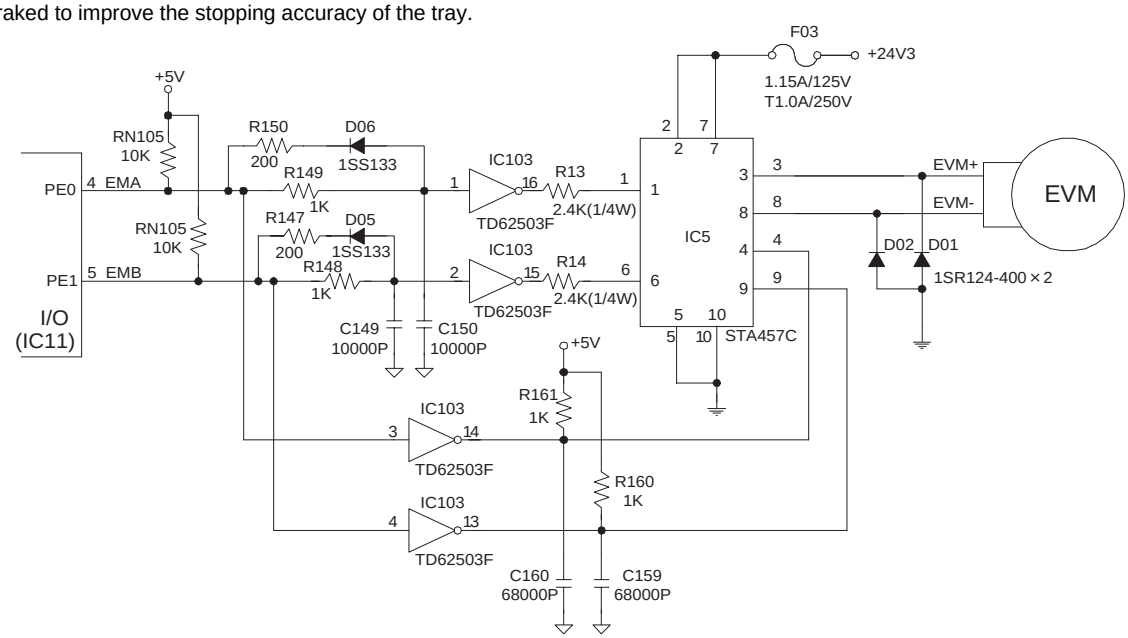
11. Elevator motor drive circuit

The elevator motor control signal (EMA, B) from the expansion I/O is inputted through the driver TD62503F (IC103) to the H driver STA457C (IC5), to drive the elevator motor which adjusts the tray height according to the paper volume stored in the off-set tray (tray 3). EMA,B signal logic controls the rotational direction of the motor (CW/CCW) to move up and down the tray.

The motor is braked to improve the stopping accuracy of the tray.

TD62503 (IC103) is a driver for driving STA457C, consists of peripheral resistors, capacitors, and diodes, which forms a delay circuit to prevent short electric current from flowing inside the H driver when EMA and B are changed over.

To protect the circuit from shorting and motor locking, a protective fuse (F3) is installed.



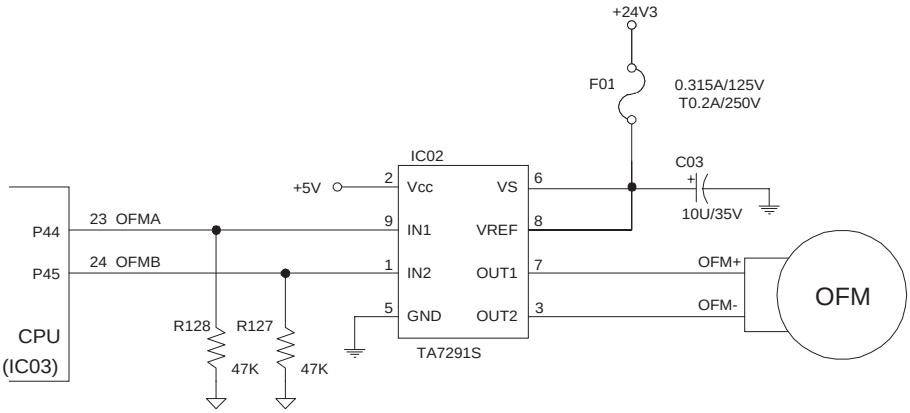
EMB	EMA	Rotational direction	Working direction
0	0	Brake	Brake
0	1	CW	Elevation
1	0	CCW	Descent
1	1	Stop	Stop

12. Off-set motor drive circuit

The off-set motor control signal (OFMA,B) from the CPU is input to the H driver TA7291S (IC2), to drive the off-set motor which moves the tray sideways against the paper discharge direction, in order to sort the sheets discharged to the off-set tray (tray 3) by the number of sheets specified.

The rotational direction of the motor is crank controlled in one direction (CW) and braked to a stop at the off-set home position.

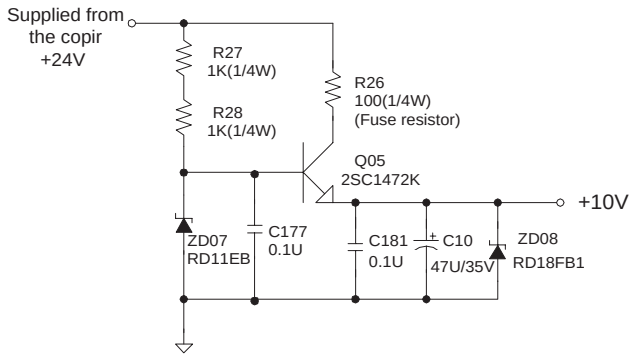
To protect the circuit from shorting and motor locking, a protective fuse (F1) is installed.



OFMB	OFMA	Rotational direction	Working direction
0	0	Stop	Stop
0	1	CCW	Not used
1	0	CW	Off-set operation
1	1	Brake	Brake

13. 10V power generating circuit

The 10V power generating circuit generates +10V which is supplied to the power supply of the transport motor IC uPD1246C (IC13) and comparator BA10393F (IC104). The circuit consists of a Zener diode RD11EB (ZD7), transistor 2SC1472 (Q5), other peripheral resistances and capacitors. +24V is reduced to about +11V by the Zener diode ZD7 and passed through the emitter follower circuit of the transistor Q5 to become about +10V for outputting.



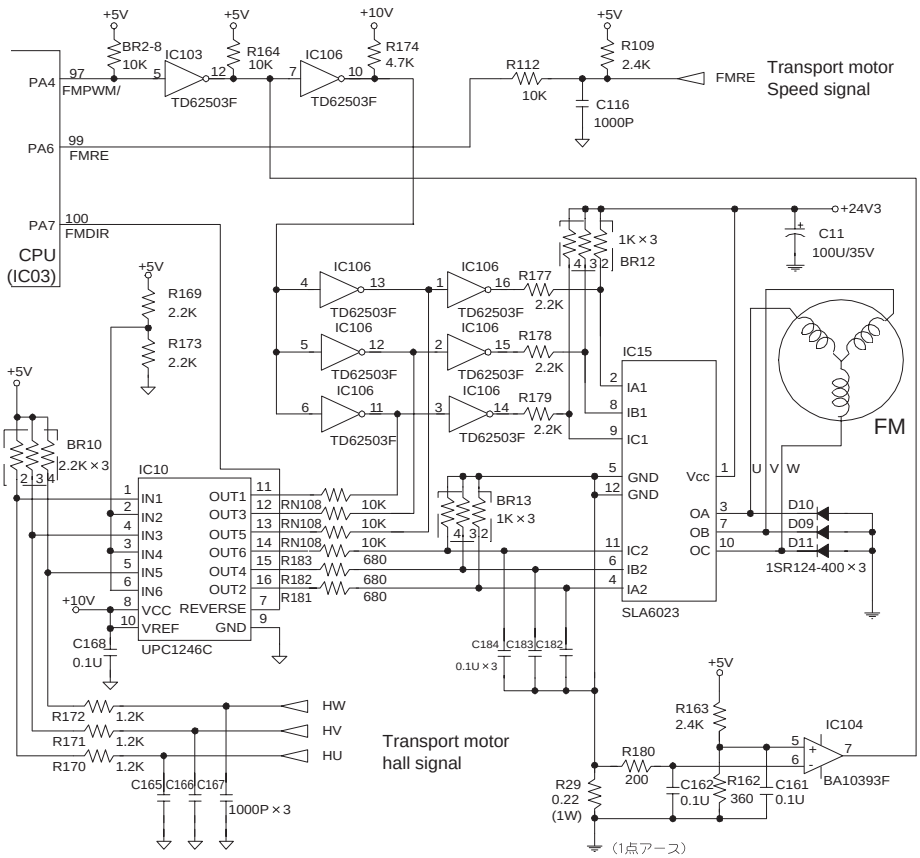
14. Transport motor drive circuit

The transport motor drive circuit consists of a motor IC yP1246C (IC10), transistor array TD62503F (IC16), motor driver IC SLA6023 (IC20) and peripheral circuits.

When the transport motor control signal (FMPWM) from the CPU becomes L level, the transistor inside the IC20 turns on to let the motor current flow to start the motor. When the motor is started, the transport motor hole signal (HU, HV, HW) input to the IC10 is changed over to switch over the drive of the transistor inside the IC20 so that the motor begins to rotate under non-controlled state.

As the transport motor rotates, the speed signal (FMRE) is output from the motor. The CPU incorporates the signal. It reduces the ON duty of the FMPWM signal to increase the speed when the motor speed is slow; it increases the ON duty of the FMPWM signal to reduce the speed when the motor speed is high. The motor speed is thus maintained at a constant speed.

As the current flowing into the motor becomes large, the current flowing to the R25 also becomes large, thus raising the voltage at the negative side of the comparator BA10393F (IC15). When this voltage becomes greater than the reference voltage (about 1.1V) preset at the plus side, the output of IC15 becomes at L level, thus turning off the IC20 transistor to restrict the current flowing to the motor (current limit setting: about 5A).



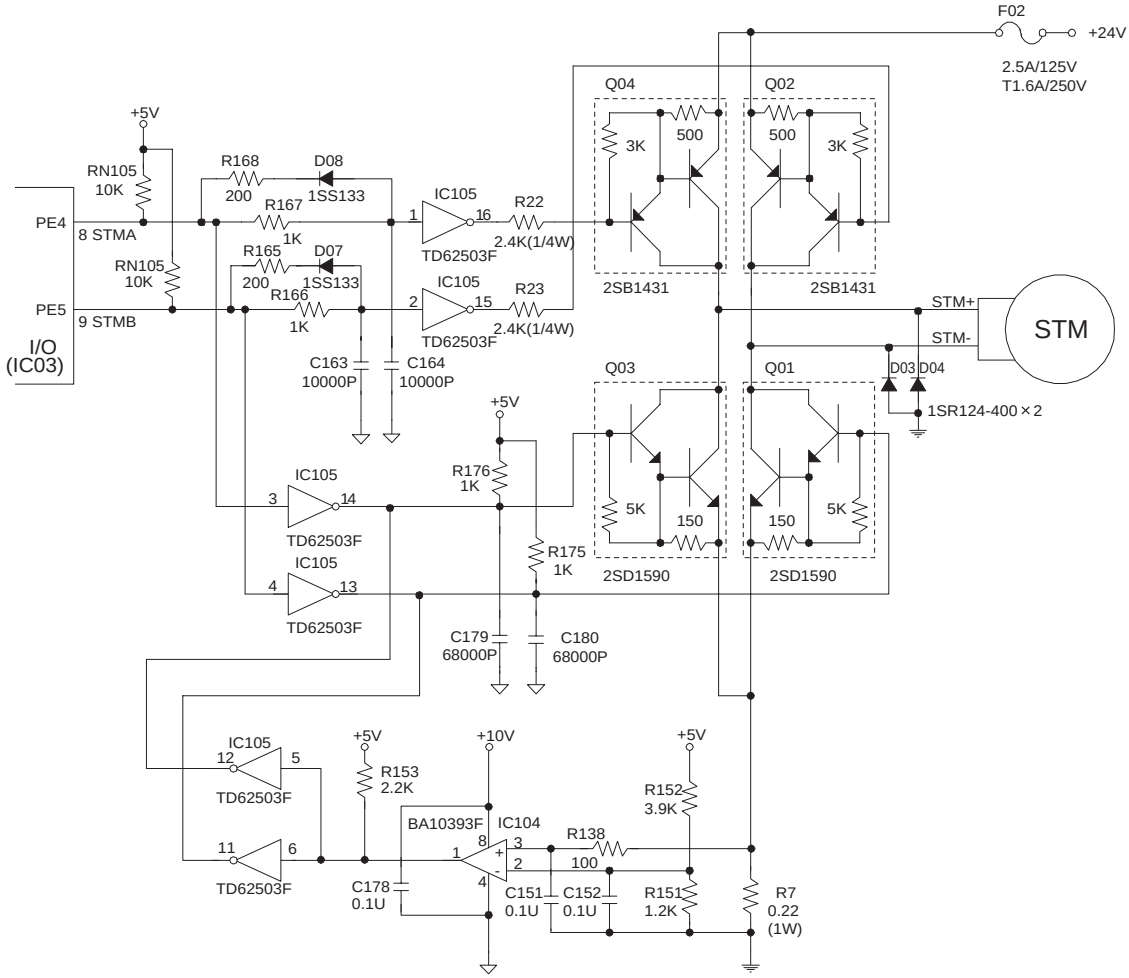
15. Stapler motor drive circuit

The control signal (STMA,B) from the expansion I/O expansion is inputted through the driver TD62503F to the H driver circuit which consists of a large-current driving transistors Q1 ~ 4, thus driving the staple motor which staples sheets.

The rotational direction (CW, CCW) of the staple motor is controlled by signal logics STMA, STMB. The motor is braked to a stop at the home position.

TD62503 (IC105) is a driver to drive Q1 ~ 4. A delay circuit is composed of peripheral resistors, capacitors, and diodes to prevent short current from flowing into the H driver circuit which is formed by Q1 ~ 4, when STMA and STMB are changed over.

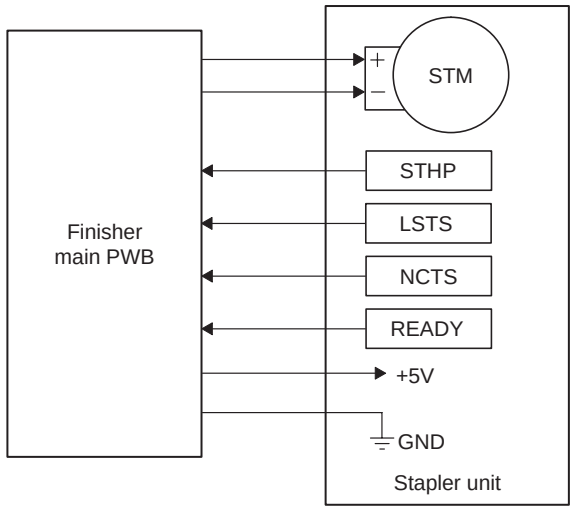
The staple motor has a large rush current. It thus has a current limit circuit consisting of a voltage comparator BA10393F (IC104) and peripheral resistances and capacitors, to apply current limit at about 5.3A. To prevent the circuit from shorting or motor locking, a protective fuse (F2) is installed.



16. Stapler unit

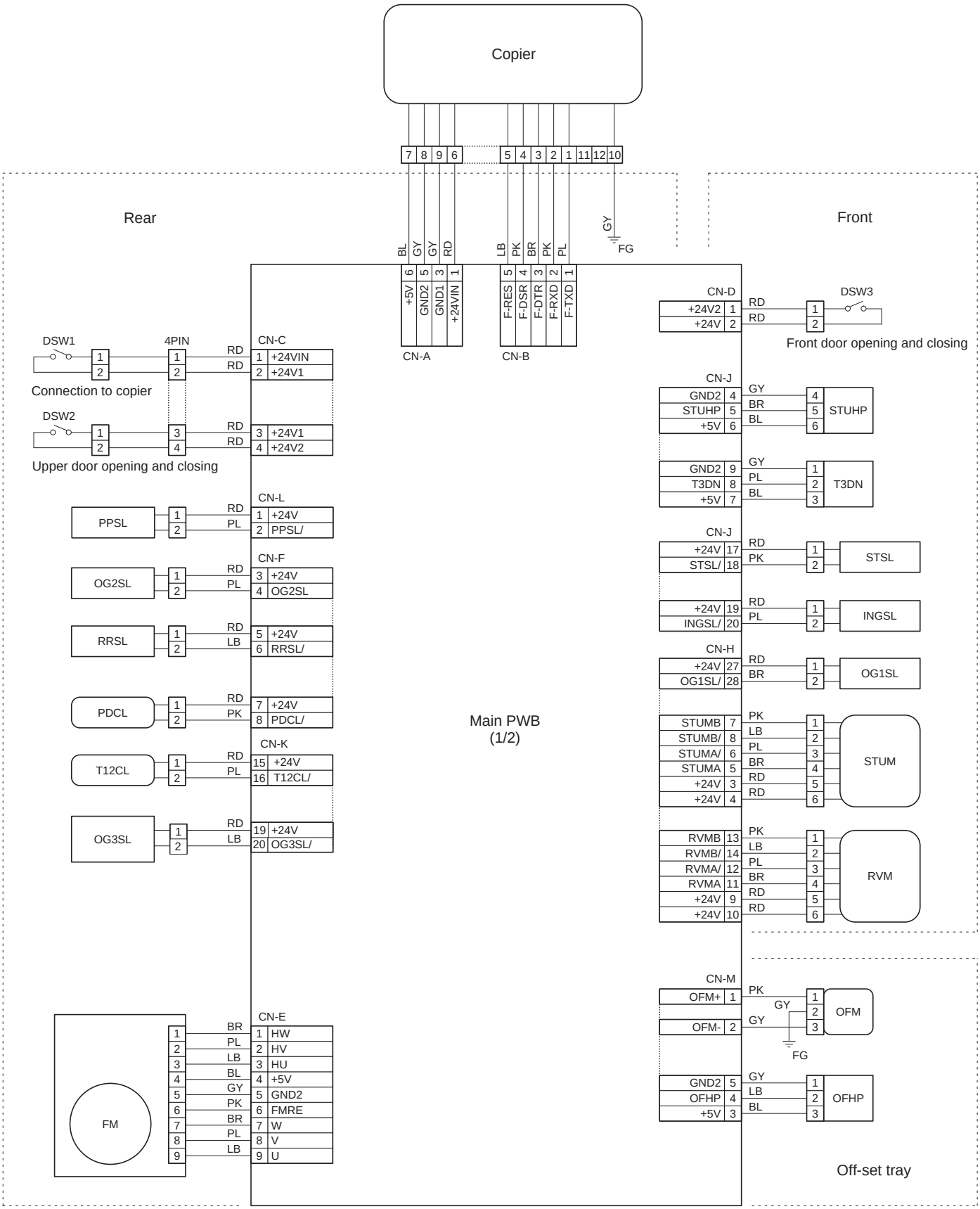
The stapler unit (EH-524S: Max Co., Ltd.) staples up to 50 sheets of 80g/m^2 paper. The unit consists of a driving DC motor (STM), home position sensor (STHP), non-needle sensor (LSTS), cartridge sensor (NCTS), and self-priming sensor which detects the stapling position of needles (READY).

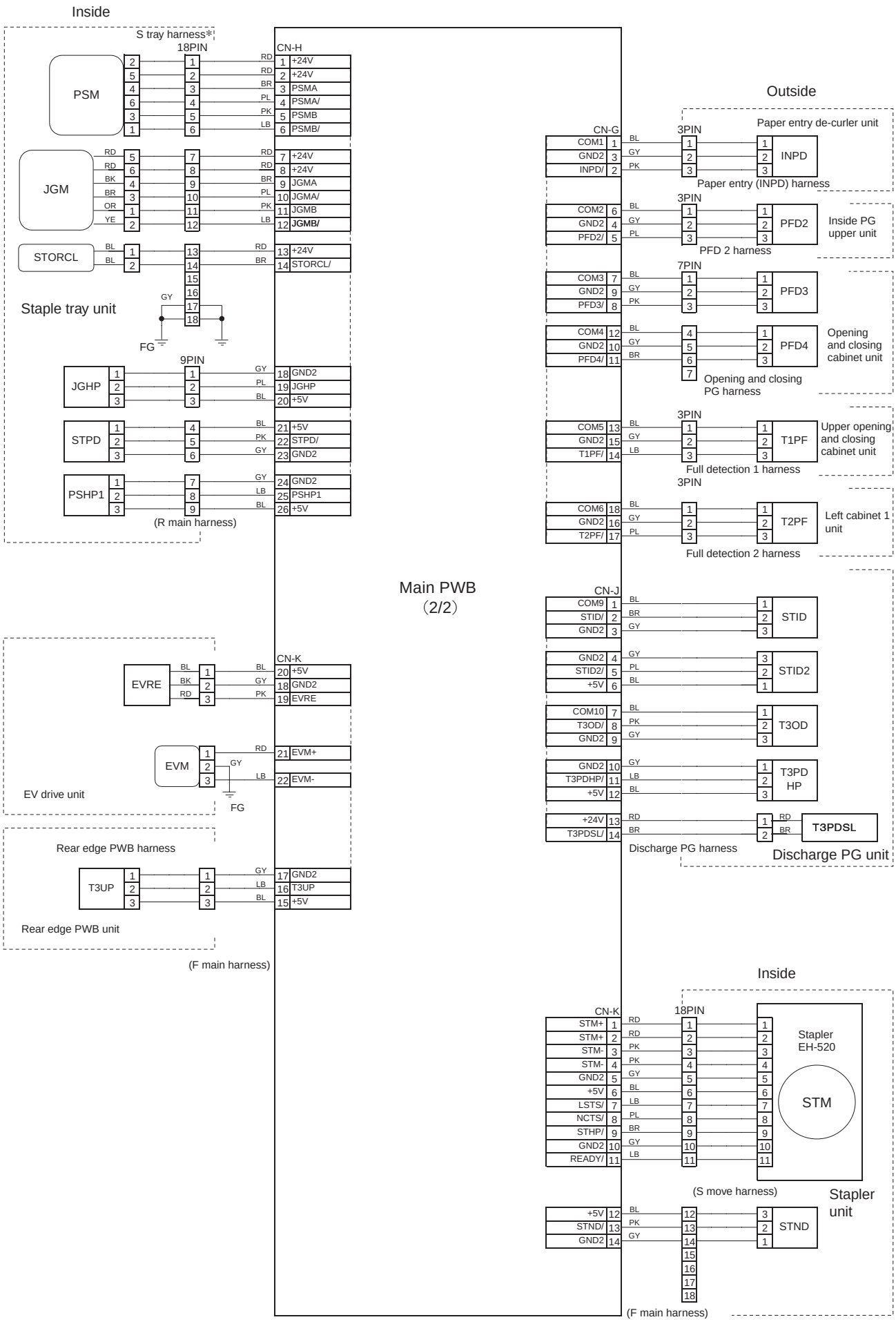
Item	Specification
Outside dimensions	97(H) × 80(W) × 104(L) mm
Stapling capacity	52 g/m^2 sheets ~ 80 g /m^2 50 sheets, below 5 mm thick
Stapling type	Bypass flat clinch
Stapling speed	400 msec or below
Needle cartridge	5000 needles



[10] ELECTRICAL SECTION

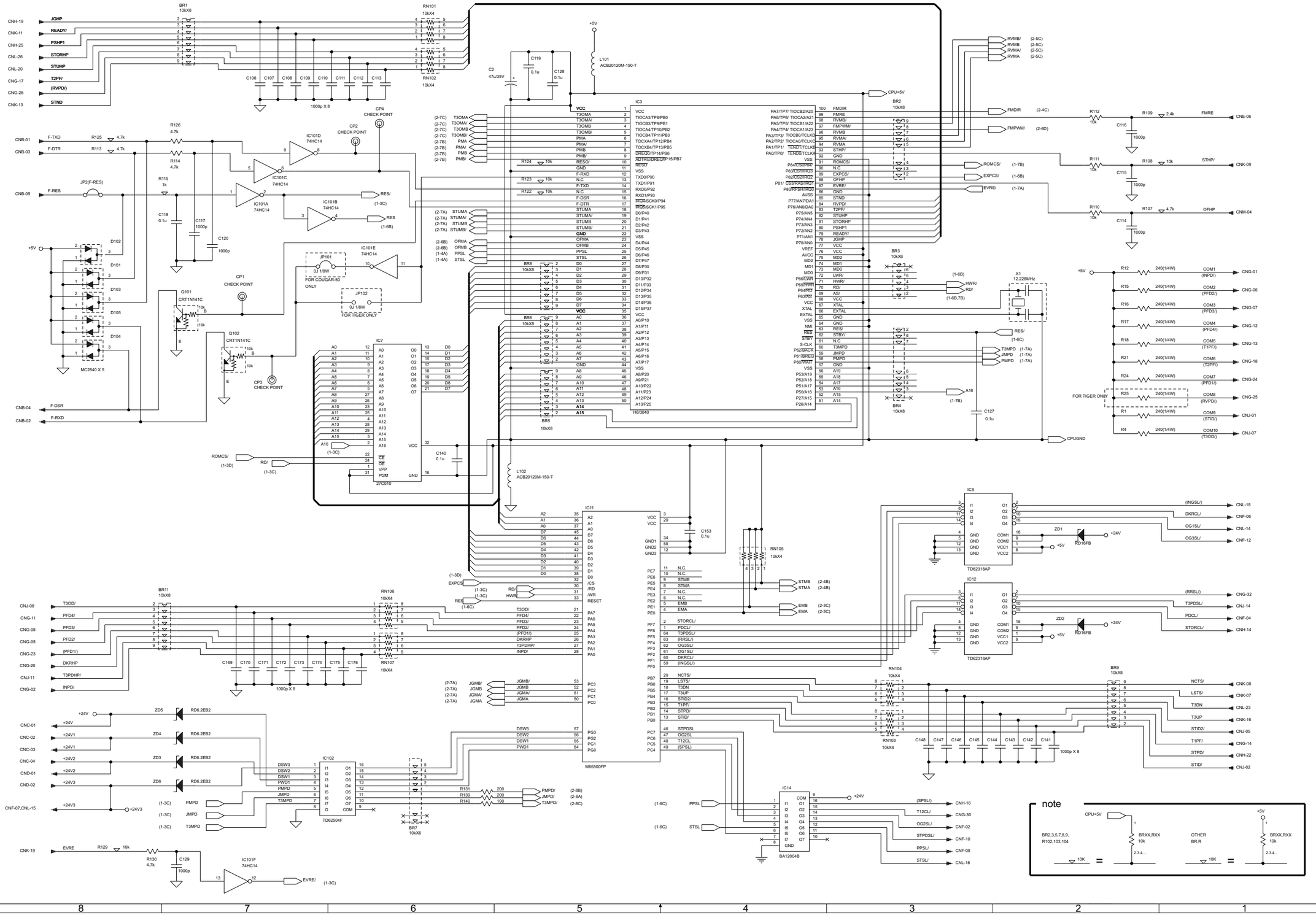
1. ACTUAL WIRING CHART DIAGRAM




Inside
S tray harness*
18PIN
CN-H
PSM
JGM
STORCL
Staple tray unit
FG
9PIN
JGHP
STPD
PSHP1
(R main harness)
Main PWB
(2/2)
Outside
CN-G
3PIN
Paper entry de-curler unit
INPD
Paper entry (INPD) harness
PFD2
Inside PG upper unit
PFD 2 harness
7PIN
PFD3
PFD4
Opening and closing cabinet unit
Opening and closing PG harness
T1PF
Upper opening and closing cabinet unit
Full detection 1 harness
T2PF
Left cabinet 1 unit
Full detection 2 harness
CN-J
STID
STID2
T3OD
T3PD HP
T3PDSL
Discharge PG harness
Discharge PG unit
CN-K
EVRE
EVM
EV drive unit
Rear edge PWB harness
T3UP
Rear edge PWB unit
(F main harness)
Inside
CN-K
18PIN
Stapler EH-520
STM
(S move harness)
Stapler unit
STND
(F main harness)

2. Main PWB

1/3


IC3
IC7
IC11
IC102
IC9
IC12
IC14
M66500FP
TD62504F
TD62318AP
BA12004B
27C010
H8/3040
note
CPU+5V
BR2,3,5,7,8,9, R102,103,104
BRXX,RXX 10k
OTHER BR,R
FOR TIGER ONLY
FOR COUGAR-50 ONLY
MC2840 X 5

Main PWB

2/3

FOR TIGER ONLY

Main PWB connector signal list

CNA (B6P-VH)

NO	SIGNAL	
01	+24V	BODY POWER
02	+24V	
03	GND1	
04	GND1	
05	GND2	
06	+5V	

CNB (B6B-PH-K-S)

NO	SIGNAL	
01	F-TXD	BODY INTERFACE
02	F-RXD	
03	F-DTR	
04	F-DSR	
05	F-RES	
06	GND2	

CNC (B4P-VH)

NO	SIGNAL	
01	+24V	DSW1
02	+24V1	
03	+24V1	DSW2
04	+24V2	

CND (B2P-VH)

NO	SIGNAL	
01	+24V2	DSW3
02	+24V3	

CNE (B10B-PHDSS-B)

NO	SIGNAL	
01	HW	FM
02	HV	
03	HU	
04	+5V	
05	GND1	
06	FMRE	
07	W	
08	V	
09	U	
10	(N.C)	

CNF (B12B-PHDSS-B)

NO	SIGNAL	
01	+24V	OG2SL
02	OG2SL/	
03	+24V	PDCL
04	PDCL/	
05	+24V	DKRCL
06	DKRCL/	
07	+24V3	PPSL
08	PPSL/	
09	+24V	STPDSL
10	STPDSL/	
11	+24V	OG3SL
12	OG3SL/	

CNG (B32B-PHDSS-B)

NO	SIGNAL	
01	COM1	INPD
02	INPD/	
03	GND2	
04	GND2	PFD2
05	PFD2/	
06	COM2	
07	COM3	PFD3
08	PFD3/	
09	GND2	
10	GND2	PFD4
11	PFD4/	
12	COM4	
13	COM5	T1PF
14	T1PF	
15	GND2	
16	GND2	T2PF
17	T2PF/	
18	COM6	
19	+5V	DKRHP
20	DKRHP	
21	GND2	
22	GND2	(PFD1)
23	(PFD1/)	
24	COM7	
25	COM8	(RVPD)
26	(RVPD/)	
27	GND2	
28	GND2	
29	+24V	T12CL
30	T12CL/	
31	+24V	(RRSL)
32	(RRSL/)	

CNH (B26B-PHDSS-B)

NO	SIGNAL	
01	+24V	PSM
02	+24V	
03	PSMA	
04	PSMA/	
05	PSMB	
06	PSMB/	
07	+24V	JGM
08	+24V	
09	JGMA	
10	JGMA/	
11	JGMB	
12	JGMB/	
13	+24V	STORCL
14	STORCL/	
15	+24V	(SPSL)
16	SPSL/	
17	GND2	
18	GND2	JGHP
19	JGHP	
20	+5V	
21	+5V	STPD
22	STPD/	
23	GND2	
24	GND2	PSHP1
25	PSHP1	
26	+5V	

CNJ (B16B-PHDSS-B)

NO	SIGNAL	
01	COM9	STID
02	STID/	
03	GND2	
04	GND2	STID2
05	STID2/	
06	+5V	
07	COM10	T3OD
08	T3OD/	
09	GND2	
10	GND2	T3PDHP
11	T3PDHP/	
12	+5V	T3PDSL
13	+24V	
14	T3PDSL/	
15	(N.C.)	
16	(N.C.)	

CNL (B30B-PHDSS-B)

NO	SIGNAL	
01	+24V	STM
02	+24V	
03	STMA	
04	STMA/	
05	STMB	
06	STMB/	
07	+24V	T3OM
08	+24V	
09	T3OMA	
10	T3OMA/	
11	T3OMB	
12	T3OMB/	
13	+24V	OG1SL
14	OG1SL/	
15	+24V3	STSL
16	STSL/	
17	+24V	(INGSL)
18	(INGSL/)	
19	+5V	STUHP
20	STUHP	
21	GND2	
22	GND2	T3DN
23	T3DN	
24	+5V	
25	+5V	STORHP
26	STORHP	
27	GND2	
28	GND2	
29	(N.C)	
30	(N.C)	

CNK (B24B-PHDSS-B)

NO	SIGNAL	
01	STM+	STPLR
02	STM+	
03	STM-	
04	STM-	
05	GND2	
06	+5V	
07	LSTS/	
08	NCTS/	
09	STHP/	
10	GND2	
11	READY/	
12	+5V	STND
13	STND	
14	GND2	
15	+5V	T3UP
16	T3UP	
17	GND2	
18	GND2	EVRE
19	EVRE	
20	+5V	
21	EVM+	EVM
22	EVM-	
23	(N.C.)	
24	(N.C.)	

CNM (B5B-PH-K-S)

NO	SIGNAL	
01	OFM+	OFM
02	OFM-	
03	+5V	OFHP
04	OFHP	
05	GND2	

CNP (B8B-PH-K-S)

NO	SIGNAL	
01	+24V	(RVM)
02	+24V	
03	RVMA	
04	RVMA/	
05	RVMB	
06	RVMB/	
07	(N.C.)	
08	(N.C.)	

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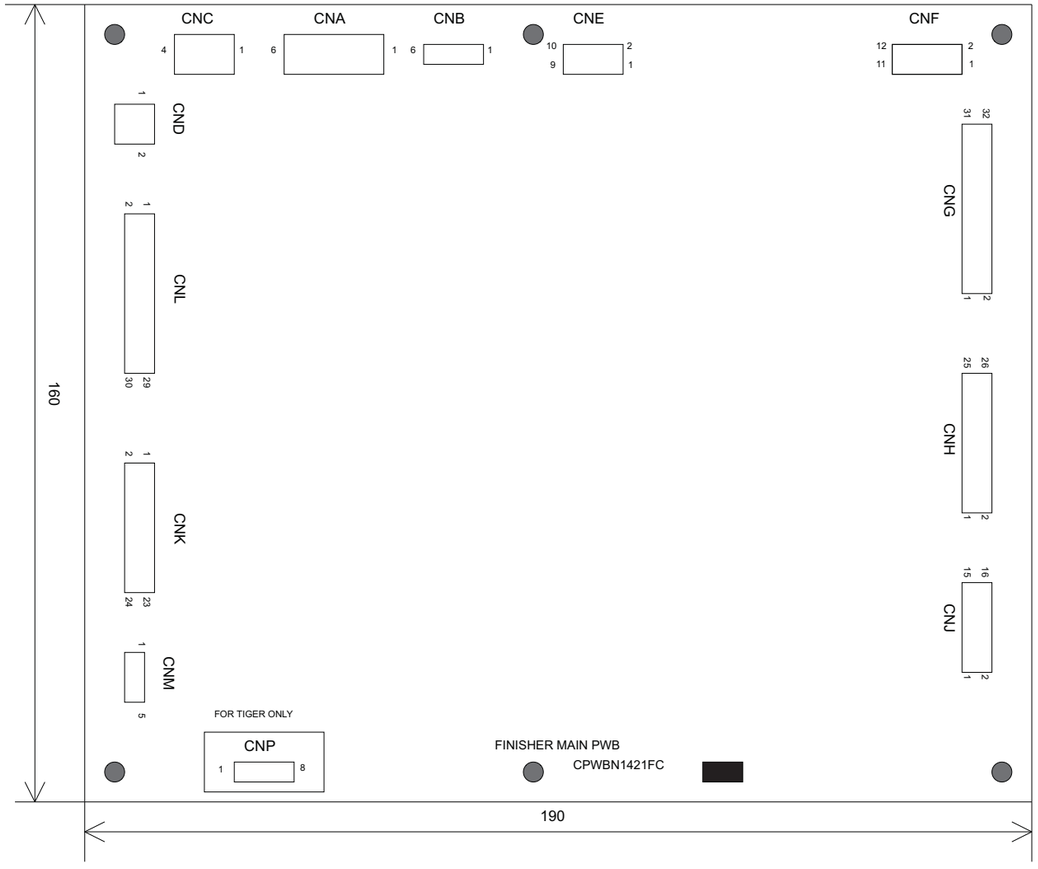
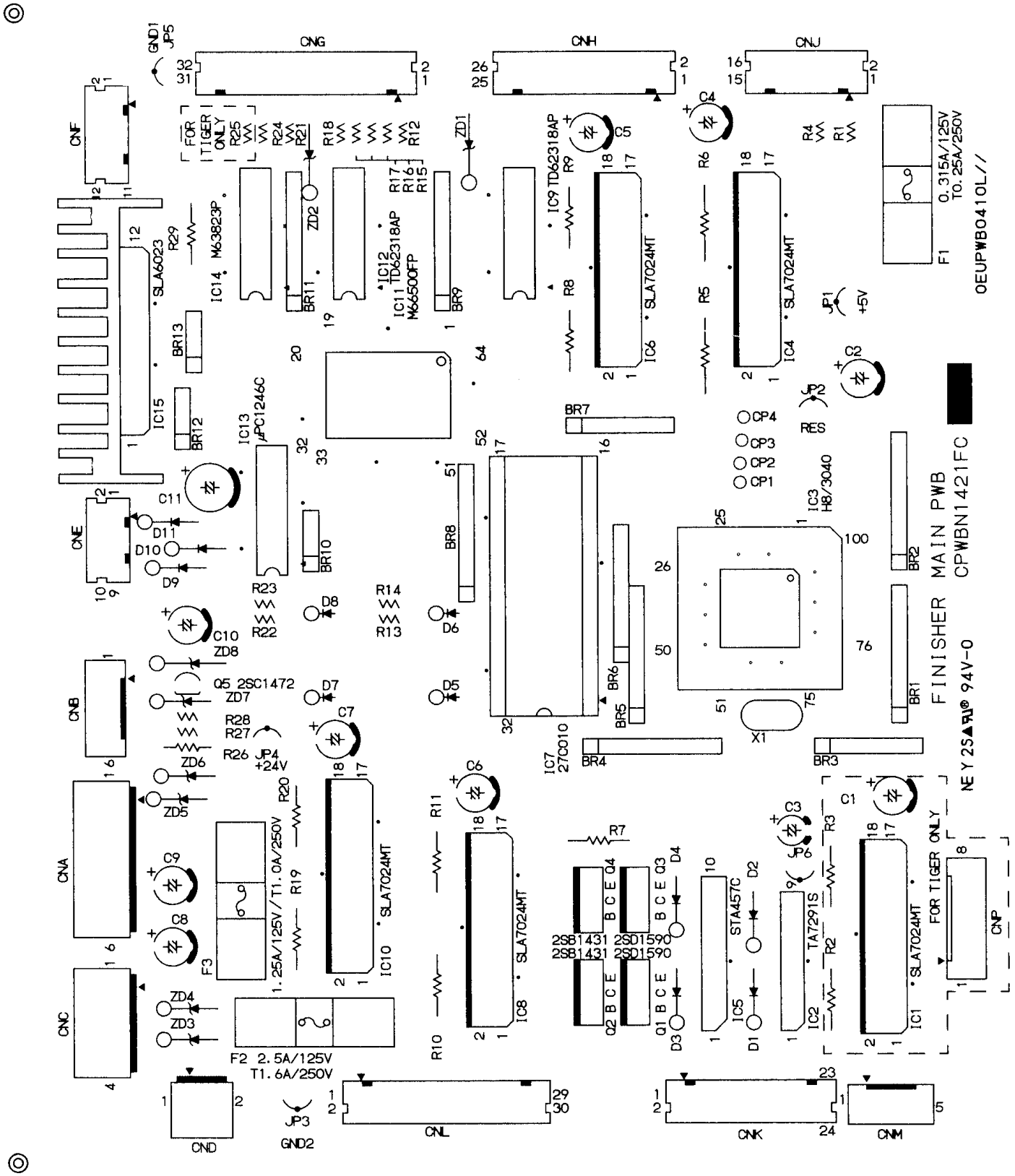
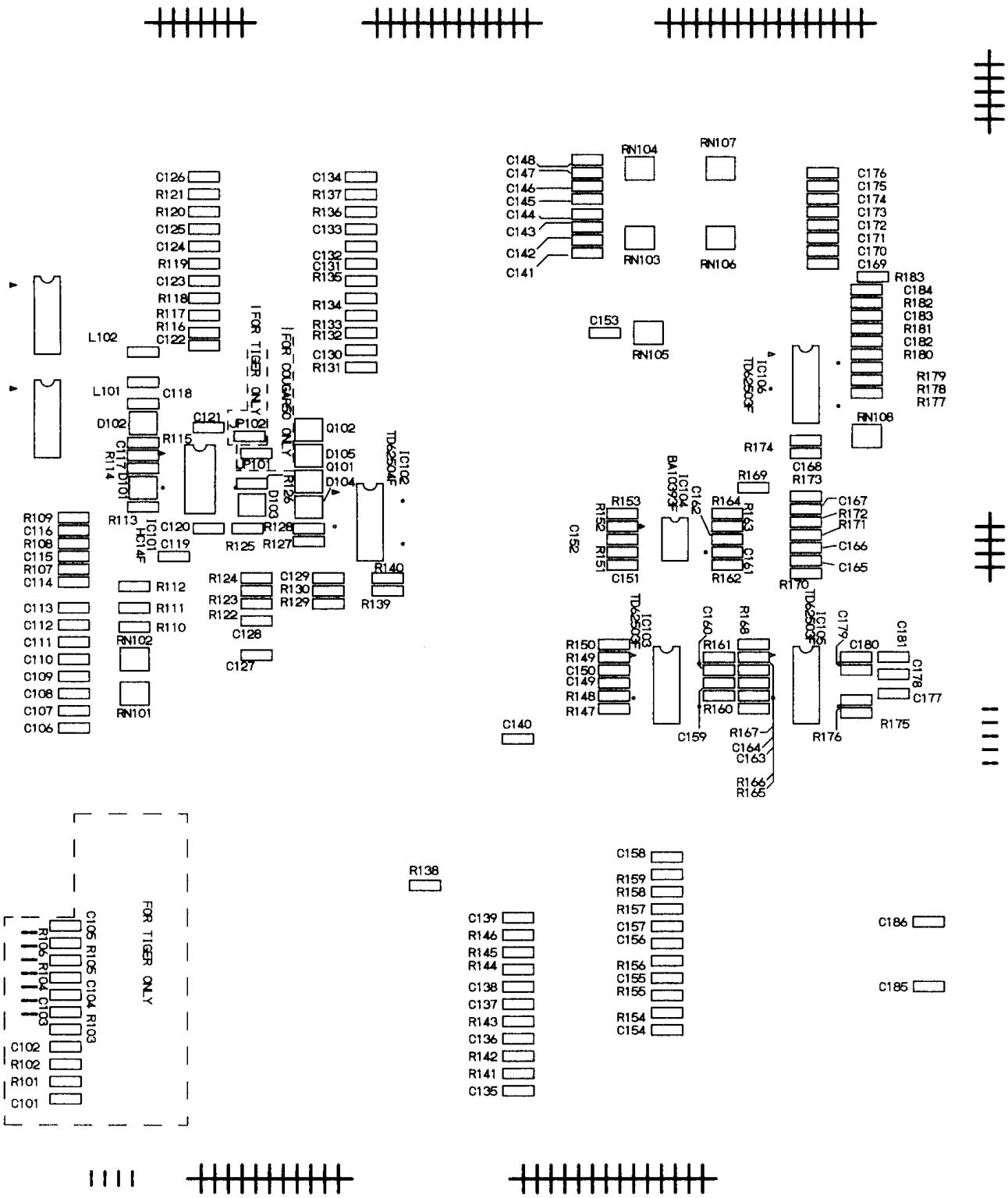


3. Main PWB page arrangement (1/2)



Main PWB page arrangement (2/2)



CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !
Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish) VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French) ATTENTION
Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish) VARNING
Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

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SHARP CORPORATION
Digital Document Systems Group
Quality & Reliability Control Center
Yamatokoriyama, Nara 639-1186, Japan

1999 August Printed in Japan